REVIEW OF METAL LITERATURE

An Annotated Survey of Articles and Technical Papers Appearing in the Engineering, Scientific and Industrial Journals and Books, Here and Abroad, Prepared by the Technical Information Division of Battelle Memorial Institute, Columbus, Ohio.

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MARJORIE R. HYSLOP, *Editor*

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PREFACE

The A.S.M. Review of Metal Literature is a monthly feature of Metals Review, published by the American Society for Metals and distributed to its members. The present volume is a collection of the installments published in Metals Review from January through December 1955. It is the twelfth volume in a series that began in 1944.

The annotations are not intended to serve as a substitute for a reading of the articles listed. They are brief abstracts designed to indicate the scope and content of the article so that the reader may determine whether it is something he wants to read in its entirety. In other words, they are indicative rather than informative abstracts.

The method of classifying the annotations into subject subdivisions is based upon the "ASM-SLA Metallurgical Literature Classification," designed by a joint committee of the American Society for Metals and the Special Libraries Association, and published by the American Society for Metals during 1950.

The table of contents lists the main headings into which the A.S.M. Review of Metal Literature is subdivided, together with secondary subdivisions indicating the scope of the main heading. The main sections are designated by capital letters, and individual annotations are identified by the appropriate capital letter preceded by a serial number. Each annotation in the text of the book is likewise followed by code symbols which refer to these main subdivisions, together with numerals which refer to subdivisions of the main classifications as listed in the table of contents. These numerals refer to the coding system used in the "ASM-SLA Metallurgical Literature Classification." For example, the symbol "C21" in parentheses at the end of an annotation indicates that the literature reference has to do with "Nonferrous Smelting and Refining" (C), and, specifically, "Smelting" (21).

The main divisions of the classification refer primarily to "processes and properties," with a final section "V" to include literature references dealing with specific materials and covering various processes and properties in a broad and general way. Materials are likewise coded by symbol at the end of each annotation. Chemical symbols of the elements are used to code metals and alloys. In addition, various materials groups are coded. For example, "EG" plus a lower-case letter refers to an "Element Group," "SG" to "Special Groups," and various combinations of capital letters indicate types of steels and cast irons. For example the symbol "C21" might be followed by the symbol "Cu," written "(C21, Cu)" and

indicating that the reference had to do with smelting of copper alloys. This coding system is explained in detail in the ASM-SLA Metallurgical Literature Classification.

An understanding of this coding system, however, is not essential to the use of this volume of the Review of Metal Literature, which is accompanied by a complete subject index starting on page 675. Since the annotations are classified primarily by processes and properties, the subject index has been prepared with the emphasis primarily on materials. Subheads and cross-references are included in sufficient detail to permit the location of articles on any specific subject related to the metal industry. Indexing is based on the content of the article and not merely on the title.

In using the book, if the primary interest is in the broad field of corrosion, or foundry practice, or heat treatment, turn immediately to the respective section as given in the table of contents. If the main interest is in aluminum alloys, or copper, or cast iron, turn to the corresponding heading in the subject index. If interest lies in specific aspects of foundry practices, or a particular type of heat treatment, these broad processes will be found broken down and subdivided in the subject index. An author index is also provided and a list of addresses of the journals and periodicals from which the literature references are taken.

The annotations have been prepared by the technical abstractors and translators of the Technical Information Division of Battelle Memorial Institute.

Marjorie R. Hyslop
Editor

May 1, 1956

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SECTION A

GENERAL METALLURGICAL

1-A. Handling Methods for Metals. Stanley S. Greene. *Flow,* v. 10, Nov. 1954, p. 75 + 19 pages.

Handling, storing and positioning metal shapes; copper and brass warehouses. Photographs. (A5, ST, Cu)

2-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 21, Oct. 1954, p. 477-484.

Covers "notch brittleness" to "oriental amethyst". (To be continued.) (A10)

3-A. Re-Melt Shell Casing Scrap. E. D. Boyle. *American Foundryman,* v. 26, Nov. 1954, p. 44-47.

Equipment and techniques. Photographs, diagram. (A8, CN)

4-A. Ion Exchange Materials in the Metallurgical Industries. T. R. E. Kressman. *Institute of Metal Finishing, Bulletin,* v. 4, Autumn 1954, p. 219-226.

Water softening and demineralization; recovery of metals from waste liquors and rinse waters. 5 ref. (A8)

5-A. Jones & Laughlin Pittsburgh Works. T. J. Ess. *Iron and Steel Engineer,* v. 31, Nov. 1954, p. 76-102 + 6 plates.

Equipment, plant layout and operations from ore, coal and limestone to finished products. Photographs, map, tables, drawings. (A5, D general)

6-A. The Iron and Steel Industry of Finland. Charles F. Goodeve. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 219-222.

Capacities, facilities and technical developments. 7 ref. (A general, ST)

7-A. The Recovery of Zinc From Dross. A. G. Thomson. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 159-160.

Basic principles and economic aspects. (A8, A4, Zn)

8-A. The British Iron and Steel Research Association. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 176-180.

Survey of more interesting projects. Photographs. (A9)

9-A. B.N.F.M.R.A. Service to Industry. B. Fullman and E. C. Mantle. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 187-191.

Services other than direct research provided by the British Non-Ferrous Metals Research Association. Graphs, photographs. (A9)

10-A. Treatment of Machine Shop and Foundry Wastes. C. W. Hathaway and R. E. Harvie. *Sewage and Industrial Wastes,* v. 26, Nov. 1954, p. 1363-1369.

Equipment and techniques for disposing of metalworking oils and the black slurry resulting from the operation of a foundry sand reclamation system. Flow sheets, diagrams. (A8, G general, E general)

11-A. Control of Accidental Discharge of Cyanide Solutions. B. A. Poole, R. H. Holtje and W. G. Belter. *Sewage and Industrial Wastes,* v. 26, Nov. 1954, p. 1382-1387.

Measures to prevent accidental discharge of plating wastes into a city sewage system. Diagrams. (A7, L general)

12-A. Survey of Smoke Control. I-II. Roger A. Renwanz and Schaeffer E. Specht. *Steel,* v. 135, Nov. 22, 1954, p. 100, 102, 116; Nov. 29, 1954, p. 76-78.

Applications of precipitators in various metallurgical operations. Table, diagrams. (A8, A7)

13-A. (French.) **Introduction of Cast Iron and Steel Turnings Into the Cupola.** *Fonderie,* 1954, no. 105, Oct., p. 4187-4189.

Enumeration of processes of melting turnings. (A8, E10, ST, CI)

14-A. (German.) **Position of the West German Iron and Steel Industry in the Free Market.** Gerhard Schroeder. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1453-1455.

Market development, scrap, wages, price policy, investments and prospects. Tables. (A4, ST)

15-A. Purity in Metals Aids Their Use. Bruce W. Gonser. *Battelle Technical Review,* v. 3, Dec. 1954, p. 129-130.

Benefits of impurity removal. Results of adding trace elements to high-purity metals.
(A general, B22, Zn, Ti, Ge)

16-A. Non-Ferrous Data for the Chemical Engineer. W. H. L. Hooper and N. P. Inglis. *Chemistry & Industry,* 1954, no. 44, Oct. 30, p. 1334-1348.

Mechanical properties, corrosion and welding of copper, aluminum, titanium and silver alloys. Photographs, graphs, tables, micrograph. 5 ref. (A general, Al, Cu, Ag, Ti)

17-A. Operations Research. Paul Ferencz. *Chemistry in Canada,* v. 6, Nov. 1954, p. 37-40.

Application of new techniques and an illustration of their use by industry to solve problems in inventory and competition. 9 ref.
(A5, S12)

18-A. Hot Labs. *Nucleonics,* v. 12, Nov. 1954, p. 35-100.

Thirty-six papers on design, construction and operation of laboratory equipment for handling radioactive materials. Data on manipulators and remote equipment for examining, sampling, analyzing, processing and testing chemical and metallurgical specimens. Graphs, photographs, diagrams, tables.
(A9, T5)

19-A. Some Applications of Ultrasonics to Industry. James Kanegis. *U. S. Department of Commerce, Technical Division Reports,* PB 111190, July 1953, 25 p.

Uses in agglomeration, pulverizing, emulsifying, machining, cleaning and nondestructive testing. 120 ref. (A general)

20-A. (Pamphlet.) **Metal Processes and Apparatus, Machinery, and Transportation Equipment.** Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $2.00.

Abstracts of 657 government-owned patents. (A general)

21-A. The A.S.M. of Tomorrow. William H. Eisenman. *Metal Progress,* v. 66, Dec. 1954, 6 p. facing p. 80.

Outline of possible future activities and expansion plans for the American Society for Metals.
(A3, A9)

22-A. (Polish.) **Recasting of Aircraft Scrap Into Alloys of Duralumin Type.** E. Zembala and M. Orman. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 239-246.

Pilot and industrial scale tests. Sorting, melting, alloying, rolling and properties of products. Tables, diagram. 11 ref. (A8, Al)

23-A. Forum on Technical Progress. *Steel,* v. 136, Jan. 3, 1955, p. 193 + 89 pages.

Brief statements by 250 recognized authorities on technological developments. (A general)

24-A. A Chronological List of the Publications of Albert Easton White. B. A. Uhlendorf, compiler. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 272-288.

List covering the period 1911 through 1952 and subjects ranging from iron ore briquettes to properties and applications of metals and alloys. 168 entries. (A general)

25-A. (German.) **Elimination of Industrial Smoke by Ultrasonics.** W. Müller. *Energietechnik,* v. 4, no. 10, Oct. 1954, p. 431-432.

Principle and research on ultrasonic dust precipitators. 9 ref. (A8)

26-A. (Book.) **Basic Metallurgy. Principles.** A. W. Grosvenor, editor. v. I. 697 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $12.50.

Textbook compiled for use in the two-year evening course sponsored by the Philadelphia chapter A.S.M., Temple University, and local industries. Covers chemistry and physics, mechanical properties, extractive metallurgy, phase diagrams, transformations, shaping, fabrication and heat treatments of ferrous and nonferrous alloys. (A general)

27-A. Metals in 1954. A. A. Watts and G. K. Manning. *Chemical and Engineering News,* v. 33, Jan. 10, 1955, p. 119-122.

Post-Korea slump cushioned by expanding construction and government support. Technical progress.
(A4)

28-A. Foundry College Sponsored in England. (Digest of "The National Foundry College"; *Metallurgia,* v. 49, Mar. 1954, p. 141.) *Metal Progress,* v. 67, Jan. 1955, p. 198, 200.

Facilities and aims of the college.
(A3, E general)

29-A. The British Non-Ferrous Metals Research Association. B. Fullman and E. C. Mantle. *Metal Progress,* v. 67, Jan. 1955, p. 93-97.

Typical of some 40 British research associations supported by industry with some government assistance is the Non-Ferrous Association with more than 600 member firms. In addition to the principal job of conducting fundamental and applied research, it provides a consulting service for solving specific problems and an information service, all free of charge to members. Photographs. (A9)

30-A. Contemporary Metal Processing Techniques in Russia. N. H. Polakowski. *Metal Progress,* v. 67, Jan. 1955, p. 98-103.

The only knowledge we have of Russian technology is that which Russia wants us to have. In spite of this severe censorship and regulation of the technical reports and periodicals, enough information leaks through the Iron Curtain to give a few clues of the progress being made in a number of its divisions in metalworking. More interesting perhaps than these rather obvious conclusions are the inferences instilled by the studious omission of news from countless branches of metallurgical endeavor. Diagrams. (A general)

31-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 21, Dec. 1954, p. 563-568.

Defines "oriental emerald" to "oxidizing agent". Tables, diagrams, graphs. (A10)

32-A. Automatic Safety System for Hydrogen Lines. (Digest of "Safety Installation for Hydrogen Distribution Lines"; *National Bureau of Standards' Technical News Bulletin,* 1954, Oct., p. 149.) *Metal Progress,* v. 67, Jan. 1955, p. 214.

Valve system permitting automatic flooding of the system with helium in case of interruption of hydrogen flow. Diagram. (A7)

33-A. (Book.) **International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings.** 1102 p. 1954. Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, Gothenburg, Sweden. $12.81.

Contains 109 papers in either English, French, or German covering theory, mineral reactions, measuring methods, catalysts, cement, ceramics, refractories, glass, metallurgy, and powder metallurgy. Metallurgical papers are individually abstracted. (A general)

34-A. (Book—German.) **Electric Heating Congress Paris and Essen.** 138 p. 1954. Vulkan-Verlag Dr. W. Classen, Haus der Technik, Hollestrasse 1 g, Essen, Germany.

Collection of papers on electric heating in the metallurgical industry covering: production, refining, and processing of pig iron and steel; production and processing of non-ferrous metals; vacuum melting and sintering; production and processing of non-metallic materials; heat and power production; construction of furnaces; and measuring technology. (A general)

35-A. Detroit Steel Corporation Completes the Expansion of Its Portsmouth Division. Charles Longenecker and Harry E. Trout. *Blast Furnace and Steel Plant,* v. 43, Feb. 1955, p. 189-216.

Equipment and layout of a modernized steel plant. Photographs, diagrams. (A5, ST)

36-A. Water Processing at Fairless Works. H. S. Spitz. *Iron and Steel Engineer,* v. 32, Jan. 1955, p. 70-77.

Dependable automatic system for supplying large amounts of water required by huge steel works. Diagrams, photographs. (A5, ST)

37-A. Developments in the Iron and Steel Industry During 1954. I. E. Madsen. *Iron and Steel Engineer,* v. 32, Jan. 1955, p. 107-150.

Review of new facilities and processes covering all phases of the industry from ore beneficiation to electrical equipment and materials handling. Photographs, diagrams. (A general, ST)

38-A. "Plancor 422"—a Wartime Steel Plant. M. E. Goetz. *Metal Progress,* v. 67, Feb. 1955, p. 109-115.

Troubles surmounted in design, construction and emergency operation of an integrated plant for making gun steel or aircraft quality steel from molten pig and own scrap, by duplexing openhearth and electric furnaces and rolling large ingots into forging blooms. Photographs. (A5, D general, ST)

39-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, Jan. 1955, p. 29-36.

Defines "oxonium" to "patio process". Photograph, tables, diagrams, graphs. (To be continued.) (A10)

40-A. (German.) **Application of the Law of Pulsation to Metallurgical Processes.** Wolfgang Küntscher. *Metallurgie und Giessereitechnik,* v. 4, no. 12, Dec. 1954, p. 533-538.

Experiments on pulsating pressure and suction during the course of combined reactions in metallurgical processes. Diagrams, tables, graphs. 6 ref. (A general)

41-A. Metals—Review and Forecast. Gold. Titanium. Silver. Aluminum. Magnesium. Copper. Zinc. Lead. Uranium. Tin. Mercury. M. A. Kriz, Thomas W. Lippert, Francis H. Wemple, Irving Lipkowitz, J. D. Hanawalt, Hans H. Wanders, Charles R. Ince, Robert L. Ziegfeld, Robert D. Nininger, George H. Cleaver and Helena M. Meyer. *Engineering and Mining Journal,* v. 156, Feb. 1955, p. 75-95.

Includes tables, graphs.
(A4, EG-a)

42-A. Ferroalloy Metals—Review and Forecast. Cobalt. Molybdenum. Chromium. Tungsten. Nickel. Manganese. Norwood B. Melcher, Hubert W. Davis, Robert W. Geehan, Charles Katlin and Gilbert L. DeHuff, Jr. *Engineering and Mining Journal,* v. 156, Feb. 1955, p. 96-101.

Includes tables. (A4, Fe-n)

43-A. Minor Metals—Review and Forecast. Beryllium. Cadmium. Antimony. Arsenic. Bismuth. Platinum. Thorium. Rare Earth Metals. Selenium. Charles White Merrill, Horace T. Reno, Robert L. Mentch, Abbott Renick, James E. Bell, John E. Crawford, Frank D. Lamb and John D. Sargent. *Engineering and Mining Journal,* v. 156, Feb. 1955, p. 102-106.

Includes tables. (A4, EG-a)

44-A. Metallurgical Principles Applied to Product Design. II. J. A. Burgard. *Western Machinery and Steel World,* v. 46, Feb. 1955, p. 104-105, 151.

Design of parts to be welded; weight considerations; strength requirements. Diagrams. (A general)

45-A. (German.) **Artificial Elements. II.** G. Herrmann. *Chemische Technik,* v. 6, no. 12, Dec. 1954, p. 663-670.

Formation and properties of elements 93 to 100. Tables. (To be continued.)
(A general, Np, Pu, Am, Cm, Cf)

46-A. (Book—English.) **Competition Between Steel and Aluminum. United Nations Economic Commission for Europe, Steel Committee.** 156 p. 1954 United Nations, Sales Section, European Office, Palais des Nations, Geneva, Switzerland; also Columbia University Press, 2960 Broadway, New York 27, N. Y. $1.25.

Trends in production and trade; prices and costs; applications in various industries.
(A4, T general, Al, ST)

47-A. (Book.) **Engineering Metallurgy.** E. M. H. Lips. 250 p. 1954. N. V. Philips' Gloeilampenfabrieken, (Philips Technical Library) Eindhoven, Netherlands. $6.25. (Translated from the Dutch by A. H. Teves-Acly.)

Metallurgical fundamentals and data of direct interest and value to design engineers. (A general)

48-A. (Book.) **A Glossary of Terms in Nuclear Science and Technology.** National Research Council. 206 p. 1953. American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. $7.00.

Proposed American standards in physics, reactor theory and engineering, chemistry, chemical engineering, biophysics, radiobiology, instrumentation, isotopes separation, and metallurgy. (A10)

49-A. (Book.) **Regional Technical Meetings, 1954.** 337 p. 1955. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

Collection of papers presented at five regional meetings. Papers were previously abstracted from preprints. (A general, ST)

50-A. (Book—German.) **Handbook of Metallurgy.** Victor Tafel. v. I. 2nd Ed. **Gold, Silver, Platinum Metals, Copper, Mercury, Bismuth.** 693 p. 1951. v. II. 2nd Ed. **Lead, Tin, Antimony, Zinc, Cadmium.** 760 p. 1953. S. Hirzel Verlagsbuchhandlung, Leipzig, Germany. $12.25.

Occurrence, production, ore processing, properties of metal and compounds, and applications for each metal.
(A general, Au, Ag, EG-c, Cu, Hg, Bi, Pb, Sn, Sb, Zn, Cd)

51-A. New Process Washes Coke Oven Gas With Waste Pickle Liquor. T. E. Dixon. *Iron Age,* v. 175, Mar. 24, 1955, p. 91-93.

Simultaneous removal of ammonia, hydrogen sulphide and hydrogen cyanide from coke oven gas is now done by washing them out with the waste pickle liquor from steel plants. Flow chart. (A8)

52-A. Processing Aluminium Scrap. Herbert Capitaine. *Metal Industry,* v. 86, Feb. 25, 1955, p. 145-146.

Sorting, classification, melting furnaces. Tables. 2 ref. (A8, Al)

53-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, Mar. 1955, p. 105-111.

Defines "petzite" to "pigging back". Diagrams, tables. (To be continued.) (A10)

54-A. Toxicity of Metals. Sources of Contamination and Assessment. A. D. Merriman. *Metal Treatment*

and Drop Forging, v. 22, Mar. 1955, p. 127-131, 118.

Possible sources of contamination of food by metallics and the degree of "pick-up". Harmful dosages. 16 ref. (A7)

55-A. (Book.) **Minerals in World Industry.** Walter H. Voskuil. 324 p. 1955. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $5.75.

A comprehensive treatment of the significance of minerals in economic productivity including ferrous and nonferrous metals, fuels, plant-food minerals, and their relation to the establishment and maintenance of a high standard of living. International political aspects of resources. (A4, B10)

56-A. (Book.) **The New Atomic Energy Law—What It Means to Industry.** 181 p. 1954. Atomic Industrial Forum, Inc., 260 Madison Ave., New York 16, N. Y. $5.00.

Aspects of the law and opportunities it offers to private enterprise as interpreted by 22 authorities. (A4, A6)

57-A. Industrial Waste Control. D. Gardner Foulke. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 63-65.

Research being devoted to problem of stream pollution abatement. (A8, L17)

58-A. History of Gun Tubes. III. Steel for Cannon. Peter R. Kosting. *Metal Progress,* v. 67, Apr. 1955, p. 109, 12 pages.

Comparison of cast iron vs. steel tubes. Transition era of cast iron to steel. Modern development of steel guns. Diagrams, tables. 27 ref. (A2, T2, ST)

59-A. Do's and Don'ts in Plating Operations. Charles Bueltman. *Metal Finishing,* v. 53, Apr. 1955, p. 40-47, 55.

Use of ion exchange equipment for treating rinse water and plating wastes. Graphs, diagrams, tables, photographs. 18 ref. (A8, L17)

60-A. (German.) **Selenium, an Important Basic Material for Industrial Production.** Wilhelm von Haken. *Chemische Industrie,* v. 7, no. 3, Mar. 1955, p. 93-96.

Scarcity and increased costs are hindering technical progress. 2 ref. (A4, Se)

61-A. Dust and Fumes From Gray Iron Cupolas—How They Are Controlled in Los Angeles County. Hoyt R. Crabaugh, Andrew H. Rose, Jr., and Robert L. Chass. *Air Repair,* v. 4, Nov. 1954, p. 125-129; disc., p. 129-130.

Engineering evaluation necessary for the determination of proper types and designs of control equipment. Tables, photographs. (A8, E10)

62-A. Air Pollution: Furnace Types and Sizes Dictate Most Effective Controls. I. N. R. Shaffer and M. A. Brower. *Iron Age,* v. 175, Apr. 28, 1955, p. 100-102.

Regulations, methods, equipment and costs required for air pollution control. Photograph, tables. (A8)

63-A. Dual Disposal System Fully Neutralizes Plating Wastes. W. G. Patton. *Iron Age,* v. 175, May 5, 1955, p. 102-104.

Automatic waste disposal system in the automobile industry to destroy cyanide and neutralize acid-alkali waste. Photographs. (A8, L17)

64-A. Air Pollution: Furnace Types and Sizes Dictate Most Effective Controls. II. N. R. Shaffer and M. A. Brower. *Iron Age,* v. 175, May 5, 1955, p. 110-112.

Uncontrolled emissions of dust and fume from gray iron cupolas can add significantly to community "smog" problems; with proper control methods this type of atmospheric contamination can be reduced by more than 95%. Tables, photographs. (A8, E10)

65-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, Apr. 1955, p. 167-174.

From "pigging-up" to "platinum-tungsten alloy". Diagrams, photographs, tables. (To be continued.) (A10)

66-A. Titanium's Future Looks Bright Despite Major Roadblocks Now Being Overcome. Walter L. Finlay. *Western Metals,* v. 13, Apr. 1955, p. 48-50.

Scarcity, technical difficulties, design properties and cost. Photographs, graphs, tables. (A4, Ti)

67-A. (German.) **The European Steel Market in 1954.** H. W. A. Waring. *Stahl und Eisen,* v. 75, no. 8, Apr. 21, 1955, p. 445-452.

Raw materials, production statistics, competition of other materials, technical developments, outlook for 1955. (A4, ST)

68-A. (Book—Spanish.) **General Metallurgy.** Emilio Jimeno and F. R. Morral. v. I-II. 1324 p. 1955. University of Madrid, Madrid, Spain.

A comprehensive treatment of physical and extractive metallurgy; ore dressing; properties; alloying;

powder metallurgy; welding; corrosion; structures. (A general)

69-A. Foundry Noise and Its Control. Herbert T. Walworth. *American Foundryman,* v. 27, May 1955, p. 104-109.

Technical factors of industrial noise exposures and some practical approaches to its control. Graphs, diagrams. 6 ref. (A5)

70-A. Some Factors Influencing the Production of Manganese. H. W. Hosking. *Australasian Engineer,* 1955, Mar., p. 70-75.

Successful operation of the two-stage process depends on control of fusion points, viscosities and thermal and electrical conductivities of the slags involved. Diagrams, graphs. (A8, Mn)

71-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, May 1955, p. 203-210.

From "platinum alloys" to "preferential deformation". Tables, micrographs, diagrams, photographs. (To be continued.) (A10)

72-A. Manganese From Steel-Plant Slags by a Lime-Clinkering and Carbonate-Leaching Process. I. Laboratory Development. R. August Heindl, J. A. Ruppert, M. L. Skow and J. E. Conley. *U. S. Bureau of Mines, Report of Investigations* 5124, Apr. 1955, 98 p.

Laboratory tests justify feasibility of recovering a high-grade manganese oxide and indicate that the process should be expanded to pilot-plant scale. Graphs, tables, flow sheets, diagrams, photograph. 5 ref. (A8, Mn)

73-A. Metallurgical Research in the Electrical Industry. Ivor Jenkins. *Birmingham Metallurgical Society, Journal,* v. 35, Mar. 1955, p. 151-168.

Role of research in the industry. Photographs. (A9, T1)

74-A. (Book.) **Some Aspects of the Canadian Iron and Steel Industry With Particular Reference to British Columbia.** G. P. Contractor. 175 p. 1954. British Columbia. Research Council, Technical Bulletin No. 21, University of British Columbia, Vancouver 8, Canada. $4.00.

A study of steel production facilities such as coal, iron ore and power resources in the province, including a description of the Tysland-Hole electric furnace and the economics of its operation. (A4, D general, ST)

75-A. Electrolytic Treatment of Waste Sulfate Pickle Liquor Using Anion Exchange Membranes. C. Horner, A. G. Winger, G. W. Bodamer and R. Kunn. *Industrial and Engineering Chemistry,* v. 47, June 1955, p. 1121-1129.

New process, using Amberplex membrane, permits recovery of electrolytic iron and the regeneration of sulfuric acid, thus eliminating the disposal problems. Graphs, diagrams. (A8)

76-A. Applications of Small Industrial Ovens. Herman Gehnrich. *Industrial Heating,* v. 22, May 1955, p. 1019 + 7 pages.

Applications and discussion of batch-type ovens. Photographs. (A general)

77-A. Unwieldy Metal Sheets Handled Neatly by Automatic Machines. *Iron Age,* v. 175, June 16, 1955, p. 96-97.

Use of feeders, turnover machines, pilers and other equipment for handling large sheets. Photographs. (A5)

78-A. Non-Ferrous Progress Since World War I. Maurice Cook. *Metallurgia,* v. 51, no. 307, May 1955, p. 227-230.

Progress in melting and casting, rolling, tube production, extrusion, furnace design, joining, and the advent of new materials and their uses. (A general, Cu, Al, Ti)

79-A. Compressed Air in Aircraft Production. W. E. Wright. *Metalworking Production,* v. 99, Apr. 22, 1955, p. 705-713.

Use of compressed air for production and testing. Photographs, diagrams. (A5)

80-A. (German.) **The Upward Tendency of World's Steel Industry.** Fritz Grotius. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 613-618.

Evolution of the young steel producing countries. Melting furnaces. The bottleneck of scrap supply. Tables. (A4, D general, ST)

81-A. (German.) **Analysis of Conversion and Processing Cost in Steel-Works as a Guide to Technical Rationalisation.** Kurt E. Poppe. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 633-640.

Percentage alterations of the initial iron quantity through successive processing stages as related to corresponding expenditures and returns, as well as to conversion and materials cost in each stage, subdivided into groups of cost types. Graphs, diagrams. (A4)

82-A. Materials Handling—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2F-14F.
Developments in equipment; future prospects for improved mechanized systems. Photographs. (A5)

83-A. Price and Production Data—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 1M + 26 pages.
Statistics on ferro-alloys, nonferrous alloys, pig iron, steel and scrap metals. Photographs, tables, graphs. (A4)

84-A. Mechanics of Tool Engineering. I. Fundamentals of Plant Layout. Andrew E. Rylander. *Western Machinery and Steel World,* v. 46, June 1955, p. 85-90.
Disposition of manufacturing equipment—or logistics—to show how machines and facilities must be properly located to provide the straight-line flow and efficient handling needed for manufacturing economy. Diagrams. (A5)

85-A. Replacement Analysis by Capitalized Costs. Frederic C. Jelen. *Chemical Engineering,* v. 62, Aug. 1955, p. 181-188.
Economics of replacement of equipments; methods of cost analysis. Graphs, table. 5 ref. (A4)

86-A. Recent Advances in Steel Technology and Market Development. *Engineers' Digest,* v. 16, June 1955, p. 267-270.
A report from the commercial and essentially lay angle of some of the more promising developments, many of which are discussed in their broad economic setting. (A4, ST)

87-A. Automation—What It Means to Foundries. W. R. Jennings. *Foundry,* v. 83, July 1955, p. 115-117.
Some factors that have created the need for automation and what it will bring in the foreseeable future. Photographs. (A5, E general)

88-A. Human Relations in the Foundry Industry. Cal C. Chambers. *Foundry,* v. 83, July 1955, p. 122-124.
Condensation of a talk given before the American Foundryman's Society on the value of personal relationship between management and employees. (A6, E general)

89-A. Personnel Practices of Foundries in the Southeast. H. Ellsworth Steele, William R. Myles and Sherwood C. McIntyre. *Alabama Polytechnic Institute, Engineering Experiment Station, Engineering Bulletin No.* 21, Feb. 1955, 16 p.
Comparisons of employment practices, wage policies and personnel management procedures in southeastern U. S. Photographs, graphs, tables. (A6, E general)

90-A. The Cyclic Flow of Metals. Clement Blazey. *Australasian Engineer,* 1955, May, p. 54-59.
Review of cycles in production and use of metallic objects, followed by scrapping, reworking, and re-use; effects of scrap quality; economic factors; conservation of resources. Flowsheets. (A8)

91-A. Steel Founders Prove That Safety Is No Accident. Jack C. Miske. *Foundry,* v. 83, Aug. 1955, p. 110-113.
Program of the Steel Founders' Society of America to promote safety programs in the plants of the member foundries. Photographs, graph, (A7)

92-A. Automatic Scrap System Handles 55 Tons Per Hour. W. G. Patton. *Iron Age,* v. 176, July 28, 1955, p. 68-70.
A new, fully automatic scrap baling system at the Ford Rouge plant handles up to 55 tons of sheet scrap per hr. Triple compression baler discharges a 1000 to 1100-lb. bale about every 30 sec. Photographs. (A8)

93-A. Cooling Towers for Steel Plants—Why, When, Where and How. Howard E. Degler. *Iron and Steel Engineer,* v. 32, July 1955, p. 105-112; disc., p. 112-113.
Re-use of circulating water by recurrent cooling in a cooling tower will minimize cleaning of tubes, require smaller cooling equipment, as well as conserve the water supply and furnish a ready means for properly treating the water. Tables, graphs, diagrams. (A5)

94-A. The Study of Materials-Handling Systems by a Lead-Shot Analogue. H. G. Jones, W. M. Davies and P. D. Dickerson. *Iron and Steel Institute, Journal,* v. 180, July 1955, p. 255-262 + 2 plates.
Experiments using lead shot as a medium in a model or analogue gives the advantage of flowing from an orifice at a speed independent of the pressure head. The flow pattern through the conveyor system, screens and bunkers associated with the blast furnace and ore-preparation plant was examined on the analogue, and bottlenecks and surplus members were recognized. Table, diagrams, photographs. 6 ref. (A5, D1)

95-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, June 1955, p. 255-262.
From "preferred orientation" to "pyrometry." Diagrams, graph, table. (To be continued.) (A10)

96-A. A Simple Treatment for the Reclamation of Tin From Soldered Metal Scrap. W. M. Halliday. *Sheet Metal Industries,* v. 32, no. 339, July 1955, p. 505-506, 508.

Equipment and methods for a lead-wash recovery process. (A8, K7, Sn)

97-A. Progress in the Design and Use of Closed-Circuit Television in Industry. L. Walter. *Sheet Metal Industries,* v. 32, no. 339, July 1955, p. 513-520.

Uses of television in testing equipment, control of mechanical handling and metal processing operations. Photographs, diagrams. 6 ref. (A5, S general)

98-A. Mechanics of Tool Engineering. XXI. Fundamentals of Plant Layout. Andrew E. Rylander. *Western Machinery and Steel World,* v. 46, July 1955, p. 65-70.

Plant layout illustrated by detailed planning of a plant for machining automotive crankshafts. Diagrams, photographs. (A5, G17)

99-A. Health Hazards From Beryllium. Merril Eisenbud. "The Metal Beryllium". American Society for Metals, p. 620-640.

Health problems, symptoms of infection and methods of handling the material to prevent the health hazard. Photographs, table. 16 ref. (A7, Be)

100-A. (German.) **Processing Fine Grain Brass Scrap by Means of Smelting and by Powder Metallurgy.** Erich Fetz. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 415-429.

Influence of size, type and composition of scrap on processing method; fluxes, additions and grain size. Advantages and disadvantages of applying powder metallurgy. Tables, graphs. 48 ref. (A8, C21, H14, Cu)

101-A. (Portuguese.) **Technical Foundations of the Primary and Transformation Industries in Latin America.** Edmundo de Macedo Soares e Silva. *ABM (Boletim da associacao brasileira de metais),* v. 11, no. 38, Jan. 1955, p. 5-30.

Views by a leading Brazilian authority on natural resources, particularly for metallurgical purposes, consumer markets, exchange among Latin-American countries and with other countries, acute problems in know-how and finance. Tables. 14 ref. (A4)

102-A. Approach to Foundry Mechanical Handling. C. M. G. Wallwork. *Institute of British Foundrymen, Proceedings,* v. 47, 1954, p. 34B-44B; disc.p. 44B-46B.

Use of work-study methods to determine handling equipment needs and economics. Tables, flow-chart. (A5, E general)

103-A. The First Half-Century in the History of the Institute of British Foundrymen (1904-1954). T. Makemson. *Institute of British Foundrymen, Proceedings,* v. 47, 1954, p. 257A-275A.

Developments in organization, activities and growth. (A9, E general)

104-A. Quality Metal and Cost Reduction Mark History of Aluminum Production. F. C. Frary. *Journal of Metals,* v. 7, Aug. 1955, p. 885-888.

Historical review of economic aspects of various methods of ore concentration and refining techniques. Photographs, diagrams. (A4, B14, C general, A1)

105-A. Continuous Ion Exchange. R. McNeill, E. A. Swinton and D. E. Weiss. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Aug. 1955, p. 912-921.

Theory and mechanism of action, applications to recovery and concentration of valuable metals, regeneration of pickling and plating liquors, prevention of pollution by waste effluents and purification of valuable metals, such as the rare earths, by chromatographic fractionation. Diagrams, graphs, tables. 21 ref. (A8, L17, C general)

106-A. The Supply of Metallurgists With Graduate Training. Michael B. Bever. *Metal Progress,* v. 68, Aug. 1, 1955, p. 82-85, 168.

Number of masters' degrees in metallurgy granted in the U. S. hit a peak in 1950 and 1951, dipped sharply in 1952 and 1953, but is on the way back up. In the same period the number of doctors' degrees has shown a steady upward trend. Graph, tables. (A3)

107-A. New Developments in Metallurgy. Bruce S. Old. *Metal Progress,* v. 68, Aug. 1, 1955, p. 105-111.

Advances in nuclear energy, gas turbine development, electronics, steel melting and other fields. Photographs. (A general)

108-A. Recovery of Plating Wastes. Louis Weisberg and Edmund J. Quinlan. *Plating,* v. 42, Aug. 1955, p. 1006-1011.

Processes used for the recovery of cyanide and chromate from plating wastes. Diagrams, tables, photographs. 5 ref. (A8, L17, ST)

109-A. Rinse Water Re-Use by Ion Exchange. Charles Bueltman and Albert B. Mindler. *Plating,* v. 42, Aug. 1955, p. 1012-1018.

Summary of the re-use of rinse waters after treatment. Plating baths and rinses, metal recovery and waste treatment. Diagrams, graph, photographs. 6 ref. (A8, L18)

110-A. Practical Methods for Treatment of Metal Finishing Wastes. J. C. Hesler. *Plating,* v. 42, Aug. 1955, p. 1019-1029.

Waste flows, plating bath rinse waters, heavy metal rinse waters and practical applications. Tables, diagrams, photograph. (A8, L17)

111-A. Solids-Liquid Separation in the Treatment of Metal Finishing Wastes. R. F. Ledford. *Plating,* v. 42, Aug. 1955, p. 1030-1036.

Methods of dewatering sludge either for re-use of the water or for simple disposal of the solids by means other than lagooning. Photographs, diagrams, tables, graphs. (A8, L17)

112-A. Water Purification With Activated Carbons. W. A. Helbig. *Plating,* v. 42, Aug. 1955, p. 1044-1045.

Use of activated carbons for the removal of organic impurities from plating rinse waters and impurities from other liquid wastes. (A8, L17)

113-A. Health Hazards in Chromium Plating and How to Prevent Them. W. Kohl. *Henry Brutcher Translation No.* 3490, 5 p. (Abridged from *Metalloberfläche,* v. 5, no. 10, 1953, p. 154B-155B). Henry Brutcher, Altadena, Calif.

Ways in which chromic acid may affect the health of operators, and means for preventing serious trouble and minimizing detrimental effects in general. (A7, L17, Cr)

114-A. (Book.) **American Society for Metals, Transactions.** Ray T. Bayless and G. G. Fitzgerald, editors, v. 47, 1051 p. 1955. American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio. $10.00.

Forty eight papers, most of which were presented at the Thirty-Sixth Annual Convention of the Society, held in Chicago, Nov. 1-5, 1954. These papers were abstracted as preprints and appeared in the Nov. 1954 issue of *Metals Review;* remaining papers are separately abstracted in this issue. (A general)

115-A. (Book.) **Metals Reference Book.** Colin J. Smithells. v. I-II. 2nd Ed. 967 p. 1955. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. $25.00.

A convenient summary of data relating to metallurgy and metal physics, presented, as far as possible, in the form of tables or diagrams with a minimum of descriptive material. Where information could not otherwise be adequately presented, short monographs are included. (A general)

116-A. Utah's Geneva Works: Producer of Steel for Western Industries. Charles Longenecker and Harry E. Trout. *Blast Furnace and Steel Plant,* v. 43, Aug. 1955, p. 869-908.

Availability of raw materials, coke and coal chemical division, blast and openhearth furnaces, blooming, slabbing, structural and strip mills, power plant and utilities, metallurgy, maintenance, transportataion, industrial relations, safety program. Photographs, diagrams, tables. (A5, D general, F general, ST)

117-A. Use of Electricity in the Steel Industry. W. F. Cartwright. *Engineer,* v. 200, July 22, 1955, p. 116-117.

How iron and steel industry affects national electrical generating industry, now and in the future. Tables. (A4, ST)

118-A. The Price of Copper, 1955-1975. William P. Shea. *Engineering and Mining Journal,* v. 156, Aug. 1955, p. 94-99.

Prediction of world requirements, supply and prices. Tables, diagrams. (A4, Cu)

119-A. Costing of Gravity-Die-Castings: Approach to the Problem in a Small Non-Ferrous Foundry. G. R. Cowley. *Foundry Trade Journal,* v. 99, July 28, 1955, p. 95-98.

How job costing can be developed into standard costing and hence into budgetary control. Although specifically prepared in relation to die-castings much of the precept and practice equally well applies to sand founding. (A4, E13)

120-A. Mechanized Handling in Foundry Cuts Worker Fatigue, Adds Safety. *Flow,* v. 10, Aug. 1955, p. 67-71.

Improvements resulting from adoption of modern methods. Photographs. (A5, E general, CI)

121-A. Iron and Steel in Canada. Gustad P. Contractor. *Iron & Steel,* v. 28, Aug. 1955, p. 384-386.

Data on steel production in British Columbia. Tables. 25 ref. (A general, B10)

122-A. Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, July 1955, p. 309-316.

From "pyrolysis" through "radioactive decay". (To be continued.) (A10)

123-A. Environment in the Foundry. *Modern Castings and American Foundryman,* v. 28, July 1955, p. 47-78.

Ventilation, health protective measures, safety precautions. Photographs, graphs. (A7, E general)

124-A. No Chain Failures in This Foundry. Jess Hogans. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 62-65.

Standard procedure for procuring, inspecting and maintaining chains and slings. Photographs, diagram. (A5, E general)

125-A. The Biological Action of Particulate Cobalt Metal. G. W. H. Schepers. *Archives of Industrial Health,* v. 12, Aug. 1955, p. 127-133.

Experiments to confirm the acute toxicity of particulate cobalt metal and to determine what chronic lesions ensued in animals which survived the intratracheal introduction of the dust. Micrographs. 5 ref. (A7, Co)

126-A. The Biological Action of Particulate Tungsten Metal. G. W. H. Schepers. *Archives of Industrial Health,* v. 12, Aug. 1955, p. 134-136.

Tungsten dust as a causative agent of the respiratory symptoms in workers in the cemented tungsten carbide tool industry. Micrographs. 8 ref. (A7, W)

127-A. Australian Iron and Steel Industry. *Engineer,* v. 200, Aug. 19, 1955, p. 267-269.

Post-war developments in the industry and plans for opening up new sources of raw materials. Map. (A general, B10, ST)

128-A. G.E. Metals and Ceramics Laboratory. A. J. Kiesler and R. E. Cech. *Foundry,* v. 83, Sept. 1955, p. 148-151.

Laboratory designed to strengthen the bond between the metallurgist and the metal producer. Diagram, photographs. (A9)

129-A. New Power, Steam and Blowing Installations at the Ohio Steel Works. J. P. Katzenmeyer. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 109-117; disc., p. 117-120.

Revision of power, steam, and blowing facilities by replacing obsolete and inadequate equipment. Tables, photographs, diagrams. (A5, ST)

130-A. Some Comments on Waste-Heat Recovery Practice. W. Gregson. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 369-374; disc., p. 374-377.

Present state of the art of waste-heat recovery as applied to the steel industry. Refers to further possibilities of heat recovery, in particular from the sensible heat in molten blast furnace slag and in coke. Diagrams, photographs. (A8, D1, ST, CI)

131-A. What's the Long-Term Outlook for Machine Tools? Sumner H. Slichter. *Iron Age,* v. 176, Aug. 25, 1955, p. 201-204.

Increased demand seems most likely; long-range planning and product innovation will add impetus to trend. Photographs. (A4, G17)

132-A. Structure and Performance in the Titanium Industry. Francis G. Masson. *Journal of Industrial Economics,* v. 3, no. 3, July 1955, p. 222-240.

Economic treatise on interplay of government, competition and diversification in the titanium industry. Table. 11 ref. (A4, Ti)

133-A. Treatment of Electroplating Wastes. A. E. J. Pettet. *Product Finishing,* v. 8, July 1955, p. 54-60.

Composition of wastes and general treatment methods. Photographs, tables. (To be continued.) (A8, L17)

134-A. Treatment of Electroplating Wastes. A. E. J. Pettet. *Product Finishing,* v. 8, Aug. 1955, p. 57-63, 102.

Methods by which wastes can be treated. Individual waste treatments, biological cyanide destruction, analytical control. Photographs, table. (A8, L17)

135-A. Safety Precautions With Grinding Wheels. H. Allen. *Product Finishing,* v. 8, Aug. 1955, p. 78-79.

Precautionary measures that should be adopted to make the use of grinding wheels safe. (A7, G18)

136-A. Expansion of World Tinplate Potential. W. E. Hoare. *Times Review of Industry,* v. 9, new ser., Aug. 1955, p. 26-27.

Plans and installations which almost double the 1939 tinplate output. Photographs, table. (A4, Sn)

137-A. Steel Mill and Coke By-Product Wastes. W. W. Hodge. Paper from "Fifteenth Annual Water Conference, Proceedings". Engineer's Society of Western Pennsylvania, p. 33-48.

Types of wastes, treatment and disposal problems. 35 ref. (A8, D general, ST)

138-A. Metal Finishing Wastes. H. W. McElhaney. Paper from "Fifteenth Annual Water Conference, Proceedings". Engineer's Society of Western Pennsylvania, p. 63-64; disc., p. 64-66.

Methods and equipment used in treatment and disposal at Talon, Inc. plant. (A8, L general)

139-A. Factors Entering Into the Selection of a Water Treating Facility for a Large Mid-Western Steel Mill. T. L. Pankey and H. F. Hansell. Paper from "Fifteenth Annual Water Conference, Proceedings". Engineer's Society of Western Pennsylvania, p. 151-160; disc., p. 161-164.

Treatment of water for use in boilers, coke oven operations and cooling systems. Tables, diagrams, photographs. (A5, ST)

140-A. (German.) **Generation and Application of Extremely High Temperatures.** W. Lochte-Holtgreven. *VDI Zeitschrift,* v. 97, no. 23, Aug. 11, 1955, p. 785-788.

Attainable temperatures with solar, gas and electric-arc furnaces. Uses of high temperatures in industry and science. 23 ref. (A general)

141-A. (German.) **Research in the Field of Nonferrous Metals.** P. Brenner. *VDI Zeitschrift,* v. 97, no. 23, Aug. 11, 1955, p. 807-810; disc., p. 810-812.

Germany's problems of doing research on nonferrous metals. (A9)

142-A. The Foundry Industry in Australia. A. W. Silvester. *Foundry Trade Journal,* v. 99, Aug. 18, 1955, p. 167-176.

Economic survey of current activities and probable future developments. Tables, graph, photographs, map. 13 ref. (To be continued.) (A4, E general)

143-A. Reduced Turbulence Boosts Dust Collector Efficiency. C. A. Gallear. *Iron Age,* v. 176, Sept. 1, 1955, p. 98-100.

Claims savings of $1500 monthly with 92.5% over-all efficiency from this new design. Costs consist mainly of operating the 1000-hp. fan motor. Diagram, photographs. (A5, B16, Fe)

144-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden. *Metal Treatment and Drop Forging,* v. 22, Aug. 1955, p. 343-350.

From "radioactive isotopes" to "Redruthite". Diagrams, tables, graphs. (To be continued.) (A10)

145-A. (English.) **Temple Steelworks at St.-Michel-De-Maurienne.** *Aciers Fins & Spéciaux Francais,* 1955, no. 20, July, p. 88-90.

Historical background, plant and production, types of material produced, application of special steels. Photographs. (A5, D general, ST)

146-A. (German.) **Extraction of Zinc From Blast Furnace Gas Filter Dust.** Hans Zieler. *Stahl und Eisen,* v. 75, no. 15, July 28, 1955, p. 975-978.

Thermal method of extraction in which a coke-iron mixture, removed in the process, is returned to the furnace. Method outlined for pelletizing the flue dust. Photograph, graph, diagrams. 3 ref. (A8, B16, Zn)

147-A. (Spanish.) **Medical Problems Posed by the Welding Profession and General Ways of Solving Them.** J. Dantin Gallego. *Ciencia y técnica de la Soldadura,* v. 5, no. 24, May-June 1955, 6 p.

Investigation for improving personal hygiene and working methods. Photographs. 16 ref. (A7, K general)

148-A. (Book.) **Encyclopedia of Chemical Technology.** Raymond E. Kirk and Donald F. Othmer, editors. v. XIV. *Thermodynamics to Waterproofing.* 980 p. 1955. Interscience Encyclopedia, Inc., 250 Fifth Ave., New York 1, N. Y.

Covers subjects from thermodynamics through waterproofing including headings of metallurgical interest. (A10)

149-A. (Book.) **Fifteenth Annual Water Conference, Proceedings.** 214 p. 1954. Engineer's Society of Western Pennsylvania, Pittsburgh, Pa.

Papers cover corrosion by water, and water supply, resources, purification, and treatment. Pertinent papers are individually abstracted. (A8, R4)

150-A. (Book.) **Production Handbook.** L. P. Alford and John R. Bangs, editors. 1676 p. 1954. The Ronald Press Co., 15 E. 26th St., New York.

Problems involved in directing men, materials, and machines of a manufacturing establishment; planning and control of effective production, time schedules, and budget and cost requirements. (A6)

151-A. A Case Study in a Heavy Foundry. J. Souter. *British Cast Iron Research Association. Journal of Research and Development,* v. 6, Aug. 1955, p. 2-7 + 6 plates; disc., p. 7-10.

General shop layout, detailed analysis of operations and movements, and feasibility of introducing incen-

tive wage payments studied in a heavy core shop attached to a jobbing foundry. Improvements are given in detail. (A5, E general, CI)

152-A. European Iron and Steel. Charles F. Goodeve. *Canadian Metals,* v. 18, Sept. 1955, p. 23-26.

A United Nations' survey projects a bright future for Western European iron and steel based on rapid development of new techniques in recent years. Photographs. (A4, Fe, ST)

153-A. British Steel Castings Research Association. Second Annual Report, Covering the Period April 1, 1954, to March 31, 1955. *Foundry Trade Journal,* v. 99, Sept. 1, 1955, p. 241-250.

Summarizes status of sponsored research projects investigating molding materials, foundry processes, industrial hygiene and properties of steel castings. Photographs, diagrams, graphs. (A9, E general, CI)

154-A. Industrial Hygiene of Uranium Processing. M. Eisenbud and J. A. Quigley. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/85, July 1955, 17 p.

Radiation hazards have been overcome. Severe exposures to both soluble and insoluble uranium have shown it to be less injurious chemically than severe exposures to nonradioactive heavy metals such as lead, arsenic and mercury. Tables, graphs. 9 ref. (A7, C general, U)

155-A. Maximum Permissible Exposure Standards. Robert S. Stone. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF. 8/P/89, June 1955, 14 p.

Since certain radiation effects are irreversible and cumulative, it is strongly recommended that exposures to all types of ionizing radiations be kept at a minimum. Tables. 23 ref. (A7, U)

156-A. Mechanism of Uranium Poisoning. H. C. Hodge. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/73, July 1955, 7 p.

Uranium is hard to absorb into the body. If absorbed, it injures the tissues of the kidney by blocking carbohydrate metabolism in the cells. 1 ref. (A7, U)

157-A. Savings Pay for Chip Processing System. Herbert Chase. *Iron Age,* v. 176, Sept. 15, 1955, p. 138-140.

Cleaned and crushed chips are blown directly into freight cars. Cutting oil recovery is about 80%. Photographs. (A8, CI, ST)

158-A. (Polish.) **Recovery of Iron From Slag Piles.** Zdzislaw Kotas. *Wiadomosci hutnicze,* v. 11, no. 5, May 1955, p. 130-134.

Demand for steel, exhaustion of mines and need for terrain covered by slag piles are causing greater interest in recovery methods, slag analyses and processing. Diagrams. (A8, B21, Fe)

159-A. (Russian.) **Utilization of Aluminum Refining Waste Red Slurry for Removing Hydrogen Sulfide From Gas.** F. P. Ivanovskii, V. A. Dontsova and T. A. Semenova. *Khimicheskaia promyshlennost',* 1955, no. 4, June, p. 218-222.

Chemical compositions of the slimes; equipment for purifying the gases; relation of sulfur capacity of slurry to carbon dioxide content of gas, temperature and other factors. Graph, diagram, tables. 8 ref. (A8, Al)

160-A. (Russian.) **Contemporary State of the Reprocessing and Use of Steel Chips.** E. M. Guzev. *Stal',* v. 15, no. 7, July 1955, p. 639-645.

Sorting, combining and briquetting methods for steel chips; remelting and type of heat treatment is governed by chip composition. Diagrams, tables, graphs, photographs. (A8, B17, ST)

161-A. Hot Laboratory Facilities and Techniques for Handling Radioactive Materials. S. E. Dismuke, M. J. Feldman, G. W. Parker and Frank Ring, Jr. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/723, June 1955, 42 p.

Configurations of laboratory building and shielding structure, remote operating contrivances and some interesting operations. Diagrams, photographs. 11 ref. (A9, A7)

162-A. Youngstown in Chicago. T. J. Ess. *Iron and Steel Engineer,* v. 32, Sept. 1955, p. 2Y-26Y.

Discusses Youngstown Sheet and Tube Co. plant in Chicago area. Photographs, diagrams, tables. (A5, D general, ST)

163-A. General View of American Metallurgy. Zay Jeffries. *Metal Progress,* v. 68, Sept. 1955, p. 74-76.

Although satisfaction can be obtained by contemplating the progress that has been made in metallurgy, workers in the field are faced with a challenge greater than any of the past. Great future opportunities await along the road toward atomic energy. (A general)

164-A. Metallurgical Education, 1955. Austen J. Smith. *Metal Progress,* v. 68, Sept. 1955, p. 110-112, 186, 190.

Metals engineers are becoming

scarcer as industry needs more, yet universities receive fewer qualified candidates. One solution suggested is greater professional consciousness. (A3)

165-A. Recovering Uranium as By-Product in Phosphate Processing. James A. Barr, Jr., John W. Ruch and Ralph F. Borlik. *Rock Products,* v. 58, Oct. 1955, p. 96, 98, 100, 102.

Problems and possibilities of recovering uranium from phosphoric acid and phosphate fertilizers. Photographs, chart. (A8, U)

166-A. (English.) **The New Sheet-Iron and Tin-Plate Mills at Ymuiden (Holland).** A. J. Van Walraven. *Acier, Stahl, Steel,* v. 20, no. 9, Sept. 1955, p. 345-351.

Description of buildings. Photographs, diagrams. (A5, F23, Fe, Sn)

167-A. (German.) **The Quality of Remelt Magnesium Alloys.** Karl Ernst Mann. *Giesserei,* v. 42, no. 19, Sept. 15, 1955, p. 515-519.

Cutting and sorting of scrap and effects of metallic and nonmetallic contaminations. Graphs, tables, micrographs. 9 ref. (A8, Mg)

168-A. (Book.) **Fourth Annual Symposium on Hot Laboratories and Equipment.** TID-5280. 383 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.75.

Papers cover equipment and methods for chemical, metallurgical, and and nuclear studies. Pertinent papers are individually abstracted. (A9, A7)

169-A. (Book.) **The Reactor Handbook.** J. F. Hogerton and R. C. Grass, editors. v. I. Physics. AECD-3645. 790 p. 1955. Technical Information Service, U. S. Atomic Energy Commission. Available from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. $4.25.

A condensed source of reliable data and reference information relating to nuclear physics, reactor statistics and dynamics, and problems of radiation and radiation shielding. (A general, P general)

170-A. (Book.) **The Reactor Handbook.** J. F. Hogerton and R. C. Grass, editors. v. II. Engineering. AECD-3646. 1075 p. 1955. Technical Information Service, U. S. Atomic Energy Commission. Available from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. $5.50.

Reactor components; physics and properties of cooling and fuel systems; corrosion problems; reactor designs. (A general, P general, R general, T25)

171-A. (Pamphlet-French.) **Aluminum and Plastic Materials. Development of Two Modern Materials. Aluminium et metiéres plastiques. Développement de deux matériaux modernes.** Raoul de Vitry. 12 p. 1955. Société d'Encouragement Pour l'Industrie Nationale, 44 Rue de Rennes, Paris, France.

General historical sketch, emphasizing French production. (A2, A1)

172-A. (Book-German.) **Reactions in and With Solids. Reaktionen in und an festen Stoffen.** Karl Hauffe. 696 p. 1955. Springer-Verlag, Berlin, Germany.

Irregularities in ion and electron semiconducting crystals and their influence on the electrical behavior of ions and valency crystals. Data on the crystals, boundary layer phenomena, chemisorption of gases and solids, diffusion in solids, oxidation reactions in metals and alloys, mechanism of ion compounds of higher order through reactions in solid condition, and on reduction and roasting processes. (A general)

173-A. Handling of Plutonium in Laboratories: Precautions. H. J. Dunster and E. J. Bennellick. *Atomics (British),* v. 6, no. 10, Oct. 1955, p. 312-320.

Covers standard laboratory facilities required, use of glove boxes, monitoring air and urine, emergency procedures for up to 10 curies. Table, diagrams, photographs. 9 ref. (A7, Pl)

174-A. Fabricating Copper Alloys. W. E. Alkins. *Metal Industry,* v. 87, Sept. 30, 1955, p. 285-288.

Casting shops, extrusion and tube mills, at research department of Thomas Bolton & Sons, Ltd. Photographs. (A5, F general, Cu)

175-A. One Hundred Years of Metallurgy at Yale. *Metal Progress,* v. 68, Oct. 1955, p. 105-108.

Historical review of educational facilities and personnel. (A2, A3)

176-A. Monel, 1905 to 1955. W. A. Mudge. *Metal Progress,* v. 68, Oct. 1955, p. 132-135.

Historical review of developments in corrosion resistance, age hardening, applications. Table, photograph. 17 ref. (A2, R general, N7, T general, Ni)

177-A. A Dictionary of Metallurgy. A. D. Merriman and J. S. Bowden.

Metal Treatment and Drop Forging, v. 22, Sept. 1955, p. 395-402.

From "redox indicators" to "recovery mill". Tables, graphs, diagrams. (A10)

178-A. Arc Welding Electrode Buyers Guide. *Steel,* v. 137, Oct. 10, 1955, p. 142-145.

Tradename designations of electrodes for stainless, mild and alloy steels, aluminum and copper, as standardized by ASTM-AWS specifications. Tables.
(A10, S22, K1, SS, Al, Cu, AY, CN)

179-A. Welding in Ancient Times. Herbert Maryon. *Welding and Metal Fabrication,* v. 23, Oct. 1955, p. 383-389.

Ferrous and nonferrous welds in archeological specimens. Photographs, diagrams. (A2, K general)

180-A. (German.) **Status of Vacuum Technology.** R. Jaeckel. *Berg- und hüttenmännische Montshefte der montanistischen Hochschule in Leoben,* v. 100, nos. 7-8, July-Aug. 1955, p. 193-201.

Evolution of industrial vacuum techniques from World War II up to present time. Tables, photograph, graphs, diagrams.
(A general, C25, D8)

181-A. (German.) **Technical Problems in Vacuum Metallurgy.** K. Diels. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, nos. 7-8, July-Aug. 1955, p. 201-207.

Problems related to vacuum application in annealing, gas evacuation, sintering, smelting and alloying, sublimation, distillation and evaporation depositing. Photographs, graphs. 4 ref.
(A general, C25, J23, H15, L25)

182-A. Automation in the Steel Industry. W. K. Scott. *Western Machinery and Steel World,* v. 46, Oct. 1955, p. 94-99.

Used in hot strip mill, continuous pickler, five-stand tandem mill, continuous annealer, tandem temper mill, flying shear and tinplating. Photographs, diagrams.
(A5, F23, ST)

183-A. Prospects for Adequate Supply of Special High Grade Zinc for Die Casting in 1956 Excellent. Charles R. Ince. *Metals (Daily Metal Reporter Monthly Supplement),* v. 26, Oct. 1955, p. 9-11.

Market discussion of supply-demand, price fluctuation, production and use by other countries.
(A4, E13, Zn)

184-A. Manganese From Steel-Plant Slags by a Lime-Clinkering and Corbonate-Leaching Process. II. Pilot-Plant Development. R. August Heindl, J. A. Ruppert, M. L. Skow and J. E. Conley. *U. S. Bureau of Mines, Report of Investigations* 5142, Sept. 1955, 80 p.

Process tested on pilot-plant scale was proved to be technically feasible. Flowsheets, tables, photographs, graphs, diagrams. 7 ref.
(A8, B21, ST, Mn)

185-A. Steel's Dynamic Progress. Max D. Howell. *Year Book* of American Iron and Steel Institute, p. 67-77.

Reviews problems solved and those still to be answered in the steel industry over the year 1954-1955.
(A4, ST)

186-A. (English.) **Removal of Hydrogen Sulphide From Industrial Gases by Means of Purifying Mass Containing Iron Hydroxide. II.** S. Vajna. *Acta Chimica Academiae Scientiarum Hungaricae,* v. 6, nos. 1-2, 1955, p. 45-76.

Proves that concentrations present in the stationary state depend mainly on the constant of the reaction velocity of oxygen. Graphs, diagram, tables. 11 ref. (A7)

187-A. (Book.) **Handbook of Engineering Materials.** Douglas F. Miner and John B. Seastone, editors. Wiley Engineering Handbook Series. 1391 p. 1955. John Wiley & Sons, New York, N. Y. $17.50.

General information on materials, metals, nonmetals, and construction materials; considers properties, adaptability, availability, and cost of each. (A general)

SECTION B

RAW MATERIALS and ORE PREPARATION

1-B. Fundamentals of Mixing and Agitation With Applications to Extractive Metallurgy. J. H. Rushton and L. H. Mahony. *Journal of Metals,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1199-1206.

Equipment and practices for improving handling, blending, flotation and leaching operations. Photographs, diagrams, tables, graph. 3 ref. (B14)

2-B. (German.) **Beneficiation of Magnetite Ore Into a High-Percentage Concentrate and Its Further Processing Into Sponge Iron in Persberg (Central Sweden).** Walter Lehnert. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 10, Oct. 1954, p. 435-440.

Reasons of smelting for sponge iron; Persberg and other sponge-iron plants; future prospects of sponge-iron production; and comparison of the Wiberg and Höganäs processes. Diagram, photographs, table. 11 ref. (B14, D8, Fe)

3-B. Sweden's Iron Ore. T. L. Joseph. *Blast Furnace and Steel Plant,* v. 42, Nov. 1954. p. 1281-1291.

Compositions, physical properties, production, distribution of exports and uses. Tables, graphs, map, flowchart, photographs. 8 ref. (B10, Fe)

4-B. New Process for Heat Hardening Taconite Pellets. *Blast Furnace and Steel Plant,* v. 42, Nov. 1954, p. 1299-1303.

Design of equipment for reconstituting fine powder from taconite concentration processes. Diagrams. (B16, Fe)

5-B. How USBM Metallurgists Are Solving the Manganese Snortage. Charles Prasky. *Engineering and Mining Journal,* v. 155, Nov. 1954, p. 72-75.

Beneficiation of low-grade manganese-bearing materials by differential high-temperature sulfatization process. Photographs, diagrams. (B14, Mn)

6-B. How Sulphide Volatilization Can Be Used in Metallurgy. A. W. Schlechten. *Engineering and Mining Journal,* v. 155, Nov. 1954, p. 81-83.

Principles, process and advantages of metal sulfide volatilization in recovery of valuable metals and in eliminating undesirable elements. Diagrams, graph, table. (B14, Cd, Pb, Zr, S)

7-B. How Sheffield's Beneficiation Plant Upgrades Texas Iron Ores. C. Leonard Lloyd, Jr. *Engineering and Mining Journal,* v. 155, Nov. 1954, p. 98-100.

Brief geological background and description of the processing. Photographs. (B14, Fe)

8-B. Sintering of Iron Ore for Blast Furnaces. *Industrial Heating,* v. 21, Nov. 1954, p. 2243-2244, 2246.

Effects of additives, moisture and coke content. (B16, D1, Fe)

9-B. Acid Pressure Digestion of Metal Ores. Phillip M. J. Gray. *Research,* v. 7, Nov. 1954, p. 432-436.

Chemical methods of ore concentration. Engineering aspects. Applications. (B14)

10-B. (German.) **Electrical Dissociation of Molten Slag and Its Use in the Determination of the Basicity of Slag.** Karlheinz Werner. *Metallurgie und Giessereitechnik,* v. 4, no. 9, Sept. 1954, p. 379-384.

Electrochemical and electrical behavior of openhearth and electric furnace slags. Graphs, diagram, tables, photographs. 21 ref. (B21, D2, D5)

11-B. (German.) **Production of Electrolytic Zinc From Zinc Blende of the Freiberg Ore Region.** Kurt Peuk-

ert and Willy Schreiter. *Metallurgie und Giessereitechnik,* v. 4, no. 9, Sept. 1954, p. 397-401.

Roasting, leaching and electrolysis. Tables. 4 ref.
(B15, B14, C23, Zn)

12-B. (Hungarian.) **Development of a New Type of Hydraulic Separator.** Andras Halasz and Laszlo Demeter. *Banyaszati Lapok,* v. 9, no. 10, Oct. 1954, p. 516-522.

Hungarian experiments with dolomite and pyrite ore for the development of a closed circuit separator. Experimental arrangement, laboratory experiments and evaluation of results. Photograph, tables, graphs. (B13)

13-B. (Hungarian.) **Processing of Calcium-Aluminate Slag in the Alumina Industry.** Istvan Magyarossy, Dénes Bartok and Andras Héjja. *Kohaszati Lapok,* v. 9, no. 10, Oct. 10, 1954, p. 467-474.

Use of concentrated sodium carbonate solutions and possibilities of combining this process with the Bayer process. Diagrams, tables.
(B14, Al)

14-B. Metallurgical Tests on Scappoose (Oregon) Iron Ore. J. P. Walsted. *U. S. Bureau of Mines, Report of Investigations* 5079, Oct. 1954, 46 p.

Beneficiation and smelting of Pacific Northwest ore. Tables, graphs, micrographs, photographs.
(B14, B10, Fe)

15-B. Wolframite (Iron Manganese Tungstate): Development of Deposits, Chemical Analysis, and Factors Affecting the Yield in the Extraction of the Metal. F. L. Casado. *Henry Brutcher, Altadena, Calif., Translation no.* 3314, 21 p. (From *Revista de la Academia de Ciencias de Madrid,* v. 39, 1945, p. 489-505.)

Study of preparation of tungstates on a pilot-plant scale. Tables. 27 ref. (B general, W)

16-B. Physico-Chemical Principles of the Production of Ferroalloys. V. P. Elyutin and B. E. Levin. *Henry Brutcher, Altadena, Calif., Translation no.* 3405, 27 p. (From *Stal,* v. 7, no. 10, 1947, p. 903-910.)

Thermodynamics of chemical processes underlying the production of ferro-alloys as a basis for selecting the most favorable production process, with special reference to reduction of Ti, Zr, W, Si, Al and Mn Graphs. 17 ref. (B22, Fe-n)

17-B. The Gutehoffnungshutte Pan Sintering Process. *Blast Furnace and Steel Plant,* v. 42, Dec. 1954, p. 1420-1424.

Highly automatic equipment and its advantages for treating fine ores, roll scale, ore concentrates and flue dust. Diagrams, photographs. (B16)

18-B. Studies on Flotation of Alumina and Depression of Silica From Kashmir Bauxite. P. K. Deshpande and G. N. Bhat. *Indian Institute of Science, Journal,* v. 36, sec. A, Oct. 1954, p. 267-276 + 1 plate.

Results of flotation techniques for enriching low-grade bauxites with high percentages of silica and iron oxides. Tables, graphs, diagram. 16 ref. (B14, Al)

19-B. Preliminary Studies on the Properties of Calcium Carbide for Metallurgical Purposes. C. E. A. Shanahan and F. Cooke. *Journal of Applied Chemistry,* v. 4, Nov. 1954, p. 602-611.

Calcium carbide bearing slag is sought for steel desulfurization. Tables, diagrams, graphs. 15 ref.
(B21, D general, ST)

20-B. Ionic Nature of Liquid Iron-Silicate Slags. M. T. Simnad, G. Derge and I. George. *Journal of Metals,* v. 6, Dec. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954, p. 1386-1390.

Physical and chemical properties of slags of various compositions. Test equipment and procedures. Diagrams, tables, graph. 17 ref.
(B21)

21-B. Developments in the Carbonate Processing of Uranium Ores. F. A. Forward and J. Halpern. *Journal of Metals,* v. 6, Dec. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954, p. 1408-1414.

Production of high-grade uranium oxide from leach solutions. Variables affecting operations. Tables, graphs. 14 ref. (B14, U)

22-B. Laboratory Recovery of Manganese Carbonate From the Martin Mine, Independence County, Ark. M. M. Fine and D. W. Frommer. *U. S. Bureau of Mines, Report of Investigations* 5086, Nov. 1954, 10 p.

Two procedures for preconcentration of ore for flotation in the recovery of ferrograde manganese products. Tables. 5 ref. (B14, Mn)

23-B. Treatment Tests of Scheelite Ores From California, Nevada, and Utah. A. L. Engel and E. S. Shedd. *U. S. Bureau of Mines, Report of Investigations* 5087, Nov. 1954, 24 p.

Results of preliminary tests to aid

in developing domestic tungsten resources by establishing satisfactory treatment methods suitable for small-scale operations. Tables. 1 ref. (B general, W)

24-B. Beneficiation of Scheelite Ore From the Sangdong Mine, Korea. P. H. Floyd and F. W. Wessel. *U. S. Bureau of Mines, Report of Investigations* 5088, Nov. 1954, 13 p.

Justification of a combined gravity, flotation and magnetic separation procedure for tungsten and bismuth concentrates from the ore. Tables, flowsheets. 3 ref. (B14, W, Bi)

25-B. (French.) **Ferro-Alloys and Mixtures of Cast Irons.** J. Pascal. *Métallurgie et la construction mécanique,* v. 86, no. 10, Oct. 1954, p. 733 + 4 pages.

Composition of ferrosilicons and ferromanganeses; examples of cast irons using ferro-alloys. Graphs, micrographs. 6 ref. (B22, CI, Fe-n)

26-B. (German.) **Magnetic Separators With Permanent Magnets for Dry Dressing of Finely Dispersed, Strongly Magnetic Iron Ores.** Erkki Laurila. *Stahl und Eisen,* v. 74, no. 25, Dec. 2, 1954, p. 1659-1661.

Behavior of magnetic powders in a moving multipolar field; design of separator. Diagrams, photograph. 4 ref. (B14, Fe)

27-B. Silver Bay Plant Will Pelletize Taconite Concentrates. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 141-142, 144, 147.

Equipment specified for new concentration plant. Diagrams, photographs. (B16, Fe)

28-B. Beryllium as an Alloying Addition. L. David. *Metallurgia,* v. 50, no. 301, Nov. 1954, p. 236-238.

Effects of small additions of beryllium to alloys of magnesium, aluminum, nickel and copper. Mechanical properties of Cu-Be alloys. (B22, Q general, Be, Mg, Al, Ni, Cu)

29-B. (German.) **Testing Sinter Quality.** Wolfgang Küntscher and Joachim Holzhey. *Metallurgie und Giessereitechnik,* v. 4, no. 10, Oct. 1954, p. 435-439.

Tests for controlling the operation of iron ore sintering plants. Diagram, photograph, graph, table. 13 ref. (B16, Fe)

30-B. (Hungarian.) **The Decomposition of Aluminate Liquor in the Presence of Red Mud. Investigation Methods and Factors Effecting the Accuracy.** Béla Lanyi. *Kohaszati Lapok,* v. 9, no. 12, Dec. 1954, p. 541-551.

Pilot-plant investigations, calculation of the degree of hydrolysis, sources of errors in the calculation, effect of decomposition and hydrolysis on production capacity. Graph, tables. 4 ref. (B14, Al)

31-B. Microorganisms in Leaching Sulfide Minerals. Loren C. Bryner, Jay V. Beck, Delmar B. Davis and Dean G. Wilson. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2587-2592.

Shows that a sterile control is not effective; nutrient solution is evaluated. Tables, photograph, graphs. 12 ref. (B14, Cu)

32-B. (German.) **Indian Manganese-Ore Deposits.** Nico Dekowski. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 11, Nov. 1954, p. 488-494.

Geology, petrography and mineralogy, methods of mining and processing the ore, production costs, ore export between 1927-1951. Map, photographs, tables. (B10, Mn)

33-B. (Italian.) **Refractoriness Tests.** R. Zoja. *Metallurgia italiana,* v. 46, no. 10, Oct. 1954, p. 343-346.

Behavior of refractories and metallurgical slags in their melting ranges. Diagrams, graph. 3 ref. (B19, B21)

34-B. (Russian.) **Economic Effectiveness of Enriching Coal for Coking.** L. I. Ulitskii. *Ugol',* 1954, no. 11, Nov., p. 33-36.

Lowering of ash content and its economic relation to ferrous metallurgy. Tables. (B22)

35-B. (Book.) **The Nation Looks at Its Resources. Mid-Century Conference on Resources for the Future.** 418 p. 1954. Resources for the Future, Inc., 1145 19th St. N.W., Washington, D. C. $5.00.

Competing demands for use of land; utilization and development of land resources; water and energy resource problems; domestic problems of nonfuel minerals; U. S. concern with world resources; problems in resources research; patterns of cooperation. (B10)

36-B. Blast Furnace Coke. *Industrial Heating,* v. 21, Dec. 1954, p. 2463-2464, 2466, 2468.

Preparation of metallurgical grade; hot water quenching; pressure-test oven. (B18, D1, B21)

37-B. Impurities in Metals. H. W. Greenwood. *Metal Treatment and Drop Forging,* v. 21, Dec. 1954, p. 571-573.

Role of some impurities in providing desired electrical, magnetic,

machining and hardening characteristics in various metals. (B22, P15, P16, G17, J26)

38-B. (German.) **Chemical and Physical Processes in the Direct-Process Revolving Tubular Furnace.** Horst Weidermann. *Metallurgie und Giessereitechnik,* v. 4, no. 11, Nov. 1954, p. 462-468.

Processes in the preheating and reduction zones during sintering of iron ore. Diagrams, graphs, photographs. 4 ref. (B16, Fe)

39-B. **History of Iron Ore Sintering Recalls Variety of Experimentation.** Michael O. Halowaty. *Journal of Metals,* v 7, Jan. 1955, p. 19-23.

Review of sintering, briquetting, blocking and nodulizing experiments leading to modern sintering practice. Photograph, diagram, tables, graph. 22 ref. (B16)

40-B. **Electrolytic Production of Hydrometallurgical Reagents for Processing Manganese Ores.** J. Bruce Clemmer, Carl Rampacek and P. E. Churchward. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 51-54.

A cyclic method for emergency use based on sodium sulfate additions and diaphragm cells. Tables, flow chart. 2 ref. (B14, Mn)

41-B. (Hungarian.) **Experiments for Accelerating the Settling of Red Mud in the Bayer Process.** Tihamér Gedeon. *Kohaszati Lapok,* v. 9, no. 8, Aug. 1954, p. 358-361.

Use of calcium carbonate or barium sulfate for establishing optimum roasting of bauxite; classifying the liquor after settling. Diagrams, tables. 4 ref. (B14, Al, Si, Fe, Ti)

42-B. (Hungarian.) **Dolomite Purification and Causticizing of Aluminate Liquors in the Alumina Plant.** Istvan Magyarosy and Antal Aradi. *Kohaszati Lapok,* v. 9, no. 8, Aug. 1954, p. 362-365.

Experimental data on substitution of dolomite for burnt lime; interpretation of results in industrial terms. Tables. (B14, Al, Mg)

43-B. (Hungarian.) **Control of the Stirring of Aluminate Liquors in the Alumina Plant by Physical Methods.** Béla Fogarasi. *Kohaszati Lapok,* v. 9, no. 8, Aug. 1954, p. 366-369.

Method for controlling changes during stirring by checking the specific gravity. Graphs, tables, nomogram. 3 ref. (B14, Al, Na)

44-B. (Russian.) **Some Basic Reactions of the Process of Oxidation of Sulfide Ores.** M. E. Pozin, A. M. Ginstling and V. V. Pechkovskii. *Zhurnal Prikladnoi Khimii,* v. 27, no. 12, Dec. 1954, p. 1237-1243.

Interaction of various sulfates with sulfides of lead, zinc or cadmium. Tables, graphs. 16 ref. (B14, Zn, Cd, Pb)

45-B. **Australian Zinc and Cadmium Industry.** R. Mallikarjunan. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Oct. 1955, p. 22-26.

Preparation of ores and refining of the metals. Tables, flowsheet. (B general, C general, Zn, Cd)

46-B. (English.) **The Calcium Oxide Wüstite System.** Vittorio Cirilli and Aurelio Burdese. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 867-878; disc., p. 879.

Studies of equilibria which exist in openhearth slags. Tables, graphs, micrograph. 15 ref. (B21, D2)

47-B. (German.) **The Electrical Conductivity of Slags in the Solid and the Molten State.** Hans Hofmann and Borut Marincek. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 523-526.

Equilibrium reactions between metal and slag phase. Diagram, table, graphs. 10 ref. (B21, P15)

48-B. (Polish.) **Obtaining Cobalt As a By-Product During the Hydrometallurgical Treatment of Lean Polymetallic Ores.** J. Kamecki and J. Sedzimir. *Hutnik,* v. 21, no. 10, Oct. 1954, p. 321-324.

Methods of cobalt recovery from copper pyrite ores. 12 ref. (B14, C21, Co, Cu)

49-B. **Effects of Quality of Scrap.** J. H. Flaherty, Jr. **Inspection and Effect of Grades of Scrap.** H. M. Parker. **Effect of Quality of Scrap in the Open Hearth.** A. K. Moore. **Selection and Use of Scrap.** G. G. Mueller. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 55-61; disc., p. 61-62.

Results of mill tests on effects of size, condition and composition of scrap on yield and quality of steel. Tables, graphs. (B22, D2, ST)

50-B. **Recent Developments in Manganese Supply.** Russell C. Buehl. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 187-191; disc. p. 191-192.

Reserves, treatment of ores and refining processes. Graph. 2 ref. (B10, C general, Mn)

51-B. Froth Flotation. Robert B. Booth. *American Cyanamid Company, Mineral Dressing Notes,* no. 21, Jan. 1955, 23 p.

Materials and machines and their applications to concentration of various ores and minerals. Diagrams. 98 ref. (B14)

52-B. Quartz Flotation With Anionic Collectors. A. M. Gaudin and D. W. Fuerstenau. *Mining Engineering,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 202, Jan. 1955, p. 66-72.

Streaming potential studies show effects of pH and sodium, barium and aluminum ions on behavior of quartz ores in water. Diagrams, graphs. 19 ref. (B14)

53-B. Caustic Soda Fusion of Zirconium Ores. H. L. Gilbert, C. Q. Morrison, A. Jones and A. W. Henderson. *U. S. Bureau of Mines, Report of Investigations* 5091, Dec. 1954, 31 p.

Process for producing zirconyl chloride from zircon sand. Proposed plant design. Tables, graphs, diagrams. (B14, Zr)

54-B. Sulfidization of Tin Oxide and Volatilization of Tin Sulfide. H. W. St. Clair, B. K. Shibler and I. S. Solet. *U. S. Bureau of Mines, Report of Investigations* 5095, Dec. 1954, 24 p.

Chemistry of the sulfide volatilization process for recovery of tin from low-grade Bolivian ores. Tables, diagrams. 20 ref. (B14, Sn)

55-B. (German.) **Evaporation and Melting in Suspension, a Contribution to the Processing of Lean Ores.** Alfred Lange. *Metallurgie und Giessereitechnik,* v. 4, no. 12, Dec. 1954, p. 538-547.

Experiments on production of zinc and lead sulfide concentrates; effects of temperature, degree of crushing, metal content; apparatus and details of operation; economic significance. Diagrams, graphs, photographs, tables. 17 ref. (B14, Zn, Pb)

56-B. (German.) **Practical Problems in the Metallurgy of Titanium.** W. J. Kroll. *Metall,* v. 9, nos. 1-2, Jan. 1955, p. 1-6.

Concentration of titanium ores; removal of iron from ilmenite; selective reduction with iron; smelting furnaces; and chlorinizability of slags. Points out that the insufficiency of the world's supply of rutile makes it necessary to produce titanium from ilmenite. Tables, graphs, diagrams. (B general, C general, Ti)

57-B. Recent Developments in Flotation Practice at the Sullivan Concentrator. P. M. Elliott and J. P. Campbell. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 514, Feb. 1955, p. 55-58; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 23-26.

Use of Dowfroth in place of standard water gas tar-creosote-cresylic acid mixture and a "dezincing" treatment of lead concentrates. Tables, graph, flow-sheet. (B14)

58-B. Ore Dressing—Review and Forecast. Milling. Iron Ore Beneficiation. Extractive Metallurgy. Nathaniel Arbiter, Fred D. DeVaney and A. W. Schlechten. *Engineering and Mining Journal,* v. 156, Feb. 1955, p. 127-138.

Includes photographs, diagram. (B13, B14)

59-B. The Processing of Uranium Ores of the Colorado Plateau by the Climax Uranium Company. Woodrow Knott. *Mines Magazine,* v. 45, Jan. 1955, p. 29-30.

Equipment and processes. (B14, U)

60-B. The Waelz Process. C. W. Jensen. *Mining Magazine,* v. 92, Feb. 1955, p. 73-79.

Process for recovery of zinc, lead, tin, antimony, cadmium, mercury, arsenic, molybdenum and thallium by vaporizing the metal from low-grade ores or residues. Table, graph.
(B14, C22, Zn, Pb, Sn, Sb, Cd, Hg, As, Mo, Tl)

61-B. Dressing Tin-Columbite Concentrates. *Mining Magazine,* v. 92, Feb. 1955, p. 86-89.

Practices used in Nigeria. Flowsheet, photograph. (B14, Sn, Cb)

62-B. (German.) **Production and High-Purification of Germanium.** Oskar Rösner. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 1, Jan. 1955, p. 1-7; disc., p. 7.

Practical methods of concentrating germanium-bearing ore and of extracting as $GeCl_4$, reducing the chloride, and refining the metal. Graphs, diagrams, micrographs. (B14, C4, Ge)

63-B. (German.) **Antimony-Ore Mining in Eastern Thuringia.** Manfred Bachmann. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 1, Jan. 1955, p. 7-14.

Geological conditions, ore deposits

and mining, dressing and smelting practices in the various regions. Maps, tables, diagrams. 5 ref. (B10, B12, B14, Sb)

64-B. Testing Steel Plant Lime. R. Sewell. *British Steelmaker,* v. 21, Feb. 1955, p. 46-48.

Method for determining reactivity of lime from various sources. Tables, graphs. 5 ref. (B22)

65-B. Flotation of Molybdenite at the Morenci Concentrator. J. E. Papin. *Mining Engineering,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 202, Feb. 1955, p. 145-147.

Flotation agents, equipment and operating procedures. Tables, flowsheet. (B14, Mo)

66-B. (Pamphlet.) **The Iron Ore Outlook of the United States.** Earl Morgan Richards. 24 p. 1954. Bucknell University Press, Lewisburg, Pa.

Known reserves; economics of recovery. (B10, A4, Fe)

67-B. Refractories in the Iron and Steel Industry. II. Alumino-Silicates: Corrosion Resistance. Helen Towers. *Iron & Steel,* v. 28, Mar. 1955, p. 101-105, 108.

Attack of refractories by various slags. Effects of permeability of linings and slag properties. 69 ref. (B19, D general)

68-B. Nickel-Cobalt Resources of Cuba. W. D. McMillan and H. W. Davis. *U. S. Bureau of Mines, Report of Investigations* 5099, Feb. 1955, 86 p.

World reserves of nickel ore; metallurgical investigations and mining of Cuban nickel-cobalt ores. Tables, maps, photographs, charts. 14 ref. (B10, Ni, Co)

69-B. Beneficiation Studies of Columbium-Tantalum-Bearing Minerals in Alluvial Black-Sand Deposits. J. E. Shelton and W. A. Stickney. *U. S. Bureau of Mines, Report of Investigations* 5105, Feb. 1955, 16 p.

Experimental study of effects of attrition scrubbing, sizing, magnetic, electrostatic and gravity separation on concentration of columbium-tantalum-bearing alluvial sands from Idaho. Tables, flow charts. (B14, Cb, Ta)

70-B. A Test for Sinter Quality. W. Küntscher and J. Holzhey. *Henry Brutcher Translation No.* 3426, 9 p. (Part from *Metallurgie und Giessereitechnik,* v. 4, no. 10, 1954, p. 435-439.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 29-B, 1955. (B16, Fe)

71-B. (French.) **Charge-Preparation Plant for the Blast Furnaces at Mont-Saint-Martin.** Aubert. *Centre de Documentation Sidérurgique, Circulaire d' Informations Techniques,* v. 12, no. 2, 1955, p. 321-343.

Crushing of ores, gathering of fines and dedusting of gas. Photographs, flowsheet, tables. (B13, D1, Fe)

72-B. Uranium Concentration With the Driessen Cone. E. O. Lilge, I. C. Edwards and H. H. McCreedy. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 515, Mar. 1955, p. 133-139; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 83-89.

Effect of equipment parameters on results. Graphs, table. (B14, U)

73-B. An Agglomeration Process for Iron Ore Concentrates. W. F. Stowasser. *Iron and Steel Engineer,* v. 32, Mar. 1955, p. 112-115; disc., p. 115.

Pilot plant process of balling the concentrates and burning these balls on a continuous horizontal grate. Photographs, diagram. (B14, Fe)

74-B. Chemistry of the Ammonia Pressure Process for Leaching Ni, Cu, and Co From Sherritt Gordon Sulphide Concentrates. F. A. Forward and V. N. Mackiw. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Mar. 1955. p. 457-463.

Laboratory and pilot plant studies on high-grade nickel concentrate produced from Lynn Lake ores. Graphs, diagrams. 21 ref. (B14, Ni)

75-B. Acid Pressure Leaching of Uranium Ores. F. A. Forward and J. Halpern. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Mar. 1955, p. 463-466.

Process for extracting uranium from ores containing sulphidic minerals, by treating an aqueous pulp of the ore with air or oxygen at elevated temperatures and pressures. Graphs. 5 ref. (B14, U)

76-B. Beneficiation Moves Forward. Norman Weiss and Stanley D. Michaelson. *Mining Engineering,* v. 7, Mar. 1955, p. 257-264.

Review of progress in 1954. Photographs. (B14)

77-B. (Chart.) **Correlation Chart of Uranium Bearing Minerals.** Colorado School of Mines Research Foundation, Golden, Colo. $5.00.

Wall chart, 50″ x 32″, contains over 160 uranium-bearing minerals;

divided into vertical chemical-radical columns, and horizontally into chemical-element bands of different colors for visual ease of correlation. Each mineral is contained in a printed box with the mineral's characteristics for definite identification. (B10, P general, S10)

78-B. Extraction of Uranium From Ore Concentrate. H. Chr. Neeb and K. Stokland. *Henry Brutcher Translation No.* 3474, 19 p. (From *Forsvarets Forsknings, Institutt Arbok III,* 1950-1951, p. 3-16.) Henry Brutcher, Altadena, Calif.

Plant design; processing steps. Diagrams. (B14, C general, U)

79-B. The Chemical Theory of Flotation. P. L. de Bruyn. Paper from "Mineral Engineering Techniques". American Institute of Chemical Engineers, p. 5-14.

Flotation circuits and systems. Flotation agents including collectors, activators and depressants. Diagrams, table. 20 ref. (B14)

80-B. Fundamentals and Applications of the Liquid Cyclone. Donald A. Dahlstrom. Paper from "Mineral Engineering Techniques". American Institute of Chemical Engineers, p. 41-61.

Basic theory; operating experience. Photographs, diagrams, tables, graphs. 39 ref. (B14)

81-B. (German.) **The Use of Beryllium in Light Metals.** E. A. Smith, Jr., and E. A. Giessen. *Metall,* v. 9, nos. 5-6, Mar. 1955, p. 198-199.

Beneficial effects on properties of aluminum alloys and aluminum dip coatings on steel and other iron alloys. Photograph, graph. 7 ref. (B22, Q general, L15, Be, Al, ST, Fe)

82-B. Effect of Fine Particle Sizes on Sulfide Flotation. Arthur P. Wichmann and Roshan Boman Bhappu. *Colorado School of Mines, Quarterly,* v. 50, Apr. 1955, 37 p.

Effect of fine particle sizes of quartz, kaolin and galena are identical in many respects. Finer sizes of these minerals cause a gradual falling off in grade and recovery of the sulfide. Tables, graphs. 14 ref. (B14)

83-B. (Czech.) **Ore Pelletizing Process.** B. Sewerynski and T. Wlazinska. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, no. 1, 1955, p. 24-29.

Survey of foreign literature concerning theory of pellet formation. Graphs. 5 ref. (B16)

84-B. (Czech.) **Hardening Process of Iron Ore Pellets.** B. Sewerynski and T. Wlazinska. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, no. 1, 1955, p. 30-34.

Factors and conditions essential for hardening of pellets. Graphs, micrographs. 6 ref. (B16, Fe)

85-B. (French.) **Study of the Desulphurization, by Agglomeration Over a Grill, of a Barytic Iron Ore.** J. Astier. *Revue de métallurgie,* v. 52, no. 1, Jan. 1955, p. 47-62; disc., p. 62.

Results of tests to determine optimum conditions for desulphurization of Khenifra iron ore. Tables, diagrams, graphs. 22 ref. (B14, Fe)

86-B. (German.) **Wet Processing of Oxidized Copper Ore by the "Compania Minera Sali Hochschild" in Copiapo, Chile.** Walter Wendt. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, no. 2, Feb. 1955, p. 109-112.

Method, optimum conditions, per cent of recovery. Flowsheet, diagram. (B14, Cu)

87-B. Reserve's E. W. Davis Works Installs New Heat Hardening Process for Taconites. *Journal of Metals,* v. 7, Apr. 1955, p. 538-539.

Heat hardening of taconite pellets promises easy quality control, minimum breakage and operating simplicity. Photographs, flowsheet, table. (B16, Fe)

88-B. J & L Pilot Plant Successful. Development Adds to Ore Supply. *Steel Equipment & Maintenance News,* v. 8, Apr. 1955, p. 16-17.

Nonmagnetic ores can be rendered magentic and then concentrated by simple magnetic separation. Diagram. (B14, Fe)

89-B. (Book.) **Metallurgy of the Non-Ferrous Metals.** W. H. Dennis. 647 p. 1954. Sir Isaac Pitman & Sons, Ltd. Pitman House, Parker Street, Kingsway, London, W.C. 2, England. 70/-net.; Pitman Publishing Corp., 2 West 45th Street., New York 19, N. Y.

Extractive metallurgy with brief references to properties and applications. (B general, C general, EG-a)

90-B. (Book.) **Mineral Engineering Techniques.** F. J. Van Antwerpen, editor. Chemical Engineering Progress Symposium Series, no. 15, v. 50. 96 p. 1954. American Institute of Chemical Engineers, 25 West 45 Street, New York 36, N. Y.

Symposium on ore beneficiation equipment and methods. Pertinent papers are individually abstracted. (B general)

91-B. Grading Minnesota Iron Ores for the Blast Furnace. Myron W. Griswold. *American Institute of Min-*

ing and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint, 1955, 6 p.

Sampling and analysis of iron ore cargoes. Tables, diagrams. (B11, Fe)

92-B. The Making of Self-Fluxing Sinter and Its Use in the Blast Furnace. Christer Danielsson. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 16 p.

Sinter production; effect of ore preparation on blast furnace performance. Graphs, tables, photographs. 20 ref. (B16, D2, Fe)

93-B. Permeability of Sinter-Plant Feed. M. O. Holowaty and John F. Elliott. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 13 p.

Factors that influence the permeability of the raw sinter feed. Tables, photographs, diagram, graphs. 5 ref. (B16, Fe)

94-B. Production and Properties of Experimental Pellet-Sinter. F. M. Hamilton and H. F. Ameen. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 8 p.

Laboratory studies of a hybrid agglomerate, termed "pellet-sinter", which was prepared by a procedure utilizing a combination of the pelletizing and sintering processes. Tables, photographs, graphs, micrographs. (B16, Fe)

95-B. Production and Use of Iron Coke. Charles C. Russell, P. Whitstone and R. P. Liggett. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 27 p.

Upgrading of fine sizes of iron ore and blast furnace flue dust by blending the fine material with coal and coking the mixture in coke ovens. Tables, graphs, micrograph, photographs. 17 ref. (B22, D1, Fe)

96-B. Sintering Practice at Ford Motor Company. Robert L. Cleveland. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 9 p.

Equipment and operating procedures. Photographs, flowsheet, tables. (B16, Fe)

97-B. Study of the Productivity of Conventional Dwight-Lloyd Sintering Machine. M. O. Holowaty, H. A. Goldfein and C. B. Sheets. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 34 p.

Factors affecting rate of sinter production. Graphs, photographs, tables, diagrams, chart. 22 ref. (B16, Fe)

98-B. Effect of Beryllium Alloying Additions. (Digest of "Beryllium as an Alloying Addition", by L. David; *Metallurgia,* v. 50, Nov. 1954, p. 236-238.) *Metal Progress,* v. 67, May 1955, p. 152, 154, 156.

Previously abstracted from original. See item 28-B, 1955. (B22, Q general, Be, Mg, Al, Ni, Cu)

99-B. Studies on Chlorination of Ilmenite. R. Manocha. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 95-104.

The selective chlorination of the iron of ilmenite with the object of reducing the iron content of the mineral, thus beneficiating it in titania. Tables. 14 ref. (B14, Ti)

100-B. Sintering Practice at Rouge Plant Utilizes Low-Grade Hematite. Robert L. Cleveland. *Journal of Metals.* v. 7, May 1955, p. 616-618.

Operation at the Ford Motor Co. plant for production, conveyance, storage and testing of sinter for blast furnaces. Photographs, table, diagram. (B16, D1, Fe)

101-B. Grinding and Classification at Humboldt. L. J. Erck. *Mining Congress Journal,* v. 41, May 1955, p. 32-35.

Operating mill exceeds capacity estimated on basis of pilot plant experience. Photographs, diagram. (B13, Fe)

102-B. Handling Difficult Flotation Froths. W. H. Reck. *Mining Engineering,* v. 7, May 1955, p. 471-472.

Pumps and other elevating equipment. Diagrams. (B14)

103-B. (German.) **Characteristic Magnitudes for Evaluating the Properties of Suspensions in Ore-Beneficiation Plants.** Friedrich Wilhelm Mayer. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 4, Apr. 1955, p. 138-146.

Relations between solid content and density of slurries. Tables, graphs, diagrams. 8 ref. (B14)

104-B. (German.) **The Stripa Specific Gravity Process.** Jonas Svensson. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 4, Apr. 1955, p. 147-152.

Sink-float separation method utilizes a heavy-medium liquid flowing in a shaking trough. (B14)

105-B. (German.) **Contribution to the Treatment of Cassiterite.** Werner Gründer. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 4, Apr. 1955, p. 152-157.

Review of methods of concentrating tin ores. Tables. 11 ref. (B14, Sn)

106-B. (German.) **Principles and Possible Applications of the Elutriation Process in Ore Beneficiation.** Franz Kirnbauer. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 4, Apr. 1955, p. 157-161.

Comparison of horizontal and vertical washing methods. Diagrams, photographs, tables. 13 ref. (B14)

107-B. (German.) **The Classifying Effect in the Rosin-Rammler-Bennett Net.** Helmut Trawinski. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 4, Apr. 1955, p. 162-170.

Ore grinding and classifying method. Graphs. 14 ref. (B13)

108-B. (Hungarian.) **Thermodynamic Investigation of the Reactions Taking Place During the Roasting of Pyrite and Sphalerite.** Zoltan Horvath. *Kohaszati Lapok,* v. 10, no. 4, Apr. 1955, p. 163-176.

Investigation of reaction kinetics; variation of the thermodynamic normal potential of the process with the temperature; equilibrium composition of the gas and its changes. Graphs. 6 ref. (B15)

109-B. (Russian.) **Results and Prospects of the Investigation of the Interaction of Reagents With Minerals in Flotation.** I. N. Plaksin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 109-134.

Determination of xanthogenates by radioactive isotopes; absorption data; time of adherence of particles to air bubble. Table, graphs. 33 ref. (B14, Pb)

110-B. Treatment of Cuban Nickel-Cobalt Ores. *Mining Journal,* v. 244, May 13, 1955, p. 530-532.

High economy recovery; treatment of nickeliferous ores; metallurgical investigations. (B14, Co, Ni)

111-B. (Danish.) **The Grinding Process Shown by the Principle of Similarity.** A. H. M. Andreasen. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning,* v. 26, no. 3, 1955, p. 86-93.

Theory of similarity applied to the different mill types furnishes a comprehensive insight into their working conditions and efficiency. Graphs, diagram, table. 5 ref. (B13)

112-B. (Book—French.) **The Enrichment of Iron Ores.** L. Coche. 158 p. 1954. Centre D'Etudes Supérieures de la Sidérurgie, 17, Avenue Serpenoise, Metz, France.

Survey of physical, chemical, and metallurgical processes in France and abroad. (B general, Fe)

113-B. Effect of Atmosphere on Refractories. Hobart M. Kraner. *American Ceramic Society Bulletin,* v. 34, June 1955, p. 173-176.

Factors of furnace operation which affect life of refractories, including dusts and their absorption by the refractory, vapor pressure of certain materials normal to metallurgical processes, variation of percentages of gaseous components, and effect of temperature alone on the constitution of important constituents of the refractory. Tables, graphs, diagram, photograph. 4 ref. (B19)

114-B. Removal of Sulphur During Iron-Ore Sintering. I. Laboratory Studies of the Kinetics of Sulphide and Sulphate Decomposition. V. Giedroyc. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 129-139.

Studies mechanism by which pyritic and sulphate sulphur is eliminated during sintering iron ores and factors affecting rate of sulphur removal using synthetic sinter mixes. Graphs, tables. 23 ref. (B16, Fe)

115-B. The Role of Iron-Ore Beneficiation. The Solution of the Taconite Problem in the U.S.A. William A. Haven *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 144-154 + 2 plates.

The increasingly important role of iron ore beneficiation in the manufacture of pig iron and the development of new agglomerating processes that have helped to solve the taconite problem. Tables, diagrams, photographs, graph. 6 ref. (B14, Fe)

116-B. Salt Lake Tungsten Company's Custom Plant Treats Low Grade Concentrates to Produce Synthetic Scheelite. Blair T. Burwell. *Mining World,* v. 17, June 1955, p. 44-49.

Objectional impurities; low-grade deposits; evolution of process; Salt Lake process; digest in pressure reactors; controls required; filtration; solution impurities; precipitation. Photographs, flowsheet. (B14, W)

117-B. Measuring the Crushing Resistance of Rocks and Ores. Benjamin B. Burbank. *Pit and Quarry,* v. 47, June 1955, p. 102-106.

A practical method of rapidly obtaining the compressive strength, elastic properties and approximate energy requirements for crushing rocks and ores. Graphs, photographs. (B13)

118-B. (German.) **The Problem of the Economy of Iron and Steel Production From Low-Grade Raw Materials.** Reinhold Baake. *Metallurgie,* v. 5, no. 3, Mar. 1955, p. 77-82.

Factors to be considered in the economical smelting of low-grade iron ores. Tables. 4 ref.
(B16, D1, Fe)

119-B. (German.) **The Metallurgical Evaluation of Iron Ores and Other Raw Materials.** A. N. Pochwisnew. *Metallurgie,* v. 5, no. 3, Mar. 1955, p. 82-85.

Mathematical determination of coke consumption and heat equivalence based on chemical composition of different iron ores. (B18, B22, Fe)

120-B. (Hungarian.) **Pelletizing of Coarse Iron-Ore Fines and Slurries.** Laszlo Visnyovszky and Tiborné Hollo. *Kohaszati Lapok,* v. 10, no. 5, May 1955. p. 201-210.

Process for utilizing the by-products of aluminum production. Laboratory experiments, pilot-plant process. Photographs, graphs, tables. 18 ref. (B16, Fe)

121-B. (Hungarian.) **Geochemistry of the Vanadium Content of Bauxite.** Tihamér Gedeon. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 229-231.

Effect of various manufacturing processes on the appearance of vanadium salt. Increasing the vanadium production and its elimination from the alumina production. 9 ref. (B general, V)

122-B. (Russian.) **Mechanism of the Interaction of Xanthates With the Surface of Sulfide Minerals.** I. N. Plaksin, S. V. Bessonov and V. I. Tiurnikova. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 331-333.

Effect of oxygen on the flotation of chalcopyrite (with quartz) in an argon medium, with varying amounts of tagged ethyl potassium xanthate being introduced. Graphs. 2 ref. (B14)

123-B. Pelletizing of Iron Ore Concentrates. I. T. L. Joseph. *Blast Furnace and Steel Plant,* v. 43, June 1955, p. 641-646.

Reserves of iron ores, development of the pelletizing process and properties of pellets. Diagram, photograph, tables, graph. 14 ref. (To be continued.) (B16, B10, Fe)

124-B. Refractories—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2J-8J.

New materials and applications in linings of furnaces and other equipment. Photographs (B19)

125-B. Use of Autoclaves and Flash Heat Exchangers at Beaverlodge. R. W. Mancantelli and J. R. Woodward. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, June 1955, p. 751-755.

Method of concentrating the material by dissolving the uranium in sodium carbonate, separating liquids from solids, and precipitating uranium from solution by sodium hydroxide. Photograph, diagrams. 4 ref. (B14, U)

126-B. Experimental Planning for Rapid Determination of Optimum Process Conditions. W. A. Griffith. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 834-838.

Fractional replication of factorial design, method for planning experimentation and for analysis of data obtained, as applied to a flotation investigation. Tables. 7 ref. (B14)

127-B. Progress in Mineral Dressing. F. B. Michell. *Mining Journal (Annual Review),* 1955, May, p. 111 + 7 pages.

Developments in crushing, classifying, and separating equipment. Photographs, diagram. 26 ref. (B13, B14)

128-B. (German.) **Synthetic Cryolite in the Aluminum Industry.** Günther Wendt. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 5, May 1955, p. 207-214.

Uses of cryolite in the ceramics, pesticides and aluminum industry; losses of cryolite in aluminum electrolysis; demand and supply of natural Na_3AlF_6; synthesis of Na_3AlF_6, its behavior in electrolysis, quality testing and recovery from smelting wastes. Tables, graphs. 27 ref. (B22, Al)

129-B. Solids Concentration. Nathaniel Arbiter. *Chemical Engineering,* v. 62, Aug. 1955, p. 163-177.

Properties of solids, review of separation processes, including sorting, gravity, magnetic, electrostatic and flotation. Photographs, tables, graphs, diagrams. (B14)

130-B. The Canadian Aluminum Industry Today. I. H. Jenks. *Metal Progress,* v. 68, July 1955, p. 90-93.

Expansion of aluminum producing facilities in northwest Canada and use of aluminum in Canadian industry. Photographs, tables. (B10, C general, Al)

131-B. Mineral Flotation With Ultrasonically Emulsified Collecting Reagents. S. C. Sun, L. Y. Tu and E. Ackerman. *Mining Engineering,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 202, July 1955, p. 656-660.

With the aid of emulsifiers, intense high-frequency sound waves are capable of emulsifying any col-

lector in water. The data shows that the ultrasonically emulsified collectors are more effective in floating mineral than the nonemulsified collectors. Tables, graphs, diagrams, photograph. 16 ref. (B14)

132-B. (French.) **The Flames of Liquid or Gas-Fuel Industrial Furnaces.** Robert Durand and Cohen-de-Lara. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 5, 1955, p. 961-977.

Turbulent diffusion of a gas jet in an unlimited space; method of injecting fuel into industrial furnaces; study of low-calorie-gas flames of openhearth furnaces. Graphs, diagrams, table. (B18, D2)

133-B. (German.) **Special Ceramic Materials for Metallurgical Purposes.** G. Jaeger. *Metall,* v. 9, no. 9-10, May 1955, p. 358-366.

Review of production, properties, behavior and uses of oxide, sulfide, carbide, nitride, and boride refractories. Tables, photographs. 41 ref. (B19)

134-B. (German.) **Slag Saturation by Capillary Action and Diffusion.** Rudolf Rasch. *Sprechsaal,* v. 88, no. 11, June 5, 1955, p. 245-248.

Distinguishes between surface diffusion, boundary-plane diffusion and lattice diffusion of slag in refractories. Effects of melting point of slag when dissolved in refractory material. Diagrams, graphs. 11 ref. (B19, B21)

135-B. (Polish.) **New Types of Basic Refractories.** W. Szymborski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 85-90.

Scarcity of magnesite deposits in Poland has necessitated a production technology of stabilized dolomite clinker as a substitute. Development principles, properties and advantages of the product. Tables, diagrams, graph. 14 ref. (B19)

136-B. (Russian.) **Chemical-Metallurgical Properties of Poor Complex Iron Ores and the Best Methods for Their Complex Utilization.** D. P. Bogatskii and G. G. Urazov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 3, Mar., p. 108-121.

Describes so-called "oxidized" iron-nickel ores from various formations in the Soviet Union. Graphs, diagram. 20 ref. (B14, Fe, Ni, Co)

137-B. (Russian.) **Investigation of the Physical-Chemical Properties of Slag Melts.** L. A. Shvartsman and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 4, Apr., p. 73-97.

Surface tension, viscosity, density and electrochemical studies of various slag systems. Cryoscopic measurements. Tables. 41 ref. (B21, Li, Mg, Ba, Al, Mg, Fe)

138-B. (Russian.) **Kinetics of Sulfide Film Formation on Heavy Metal Oxide Surfaces Under Flotation Conditions.** S. I. Mitrofanov, I. A. Strigin, V. G. Kushnikova and G. S. Rozhavskii. *Kolloidnyi Zhurnal,* v. 17, no. 3, May-June 1955, p. 235-241.

Relation of rate of sulfidization to concentration of Na_2S and to temperature, in the case of cerussite and malachite. Graphs. 2 ref. (B14, Cu, Pb, Al, Fe)

139-B. (Slovenian.) **Physical-Chemical Conditions for the Hydrometallurgical Recovery of Copper From Yugoslav Copper Ores.** Krsto Cazafura and Boris Mejac. *Rudarsko-metalurski zbornik,* 1954, nos. 3-4, p. 191-217.

Chemical and mineralogical makeup of these ores. Chemical composition of flotation concentrates; oxidation-ammonia leaching of minerals and their flotation concentrates; effect of temperature and mixing speed on rate of reaction. Graphs, tables, photographs. 13 ref. (B14, Cu)

140-B. Pelletizing of Iron Ore Concentrates. H. T. L. Joseph. *Blast Furnace and Steel Plant,* v. 43, July 1955, p. 745-752.

Role of oxidation and recrystallization in the bonding of pellets which will resist breakage during handling and shipping. Graphs, micrographs, table, diagram, photographs. 5 ref. (B16, Fe)

141-B. Milling at Lynn Lake. R. T. Drake. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 519, July 1955, p. 390-395; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 206-211.

Crushing and milling operations on copper-nickel ores. Flowsheet, tables. (B13, Cu, Ni)

142-B. Processing of Monazite. C. S. Acharya. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 2, Jan. 1955, p. 20-23.

Combined gravity, magnetic and chemical treatment of Travancore beach sands for recovery of thorium, uranium and rare earths. 17 ref. (B14, Th, U, EG-g, 1)

143-B. Marmora Mine and Plant Ships Pellets to Feed Bethlehem's Blast Furnaces. *Engineering and Mining Journal,* v. 156, July 1955, p. 75-79.

Mine and plant facilities for handling 37% iron ore which is enriched to 65% iron pellets and shipped from Picton, Ont., dock. Flowsheet, photographs. (B16, Fe)

144-B. How Bunker Hill Blends Charge for Better Lead Smelting. *Engineering and Mining Journal,* v. 156, July 1955, p. 83-85.

New $2.5 million Kellogg, Idaho, plant consists of four separate units —crushing, proportioning, bedding and pelletizing. Flowsheet, photographs. (B14, B16, Pb)

145-B. Iron and Steel in Canada. Gustad P. Contractor. *Iron & Steel,* v. 28, July 1955, p. 347-351.

Feasibility of establishing a primary iron and steel industry in the lower mainland region of British Columbia. Tables, maps. 25 ref. (B10, Fe, ST)

146-B. Occurrence of Beryllium Ores and Their Treatment. W. R. Griffitts and J. J. Norton, Paper from "The Metal Beryllium". American Society for Metals, p. 42-48.

Distribution, occurrence in pegmatites and non-pegmatic rocks, methods of prospecting, exploration, evaluation, beryl mining and world resources. 7 ref. (B10, Be)

147-B. The Refractory Properties of Beryllium Oxide. J. F. White. Paper from "The Metal Beryllium". American Society for Metals, p. 599-619.

Chemical and physical properties and the manufacture and uses of beryllia refractories. Tables, graphs. 91 ref. (B19, P general)

148-B. (French.) **Comparative Study of the Reactivity of Cokes and Their Internal Surface.** Marthe Bastick, Jack Bastick, Michel Moutach and Henrie Guérin. *Comptes rendus,* v. 240, no. 26, June 27, 1955, p. 2524-2526.

Hydro reactivity and carboxy reactivity tests made on different cokes. Study of variation of surface as a function of degree of wear by carbon dioxide and water. Graphs. 4 ref. (B18)

149-B. Titanium in Iron and Steel. A. E. Williams. *Iron & Steel,* v. 28, June 1955, p. 307-310.

Reactions of titanium when used in refining and as an alloying agent. Photograph, tables, graphs. (B22, AY, CI, Fe, Ti)

150-B. Chlorination of Travancore Monazite. II. Separation of Thoria From Rare Earths With Urotropine. B. Sarma and J. Gupta. *Journal of Scientific & Industrial Research,* v. 14, sec. B, Feb. 1955, p. 82-84.

Simple method for precipitating pure thorium hydroxide from the chloride solution by the use of a mixture of urotropine and hydrochloric acid. Tables. 6 ref. (B14, Th)

151-B. Beneficiation of Low Grade Pyrite From Amjor, Bihar. S. K. Banerjee and P. I. A. Narayanan. *Journal of Scientific & Industrial Research,* v. 14, sec. B, Mar. 1955, p. 115-117.

Investigation to determine amenability of the ore to the ordinary ore-dressing methods and to find the grade and recovery that could be obtained. Tables. (B14, Fe)

152-B. The Orthosilicate-Iron Oxide Portion of the System CaO-"FeO"-SiO_2. W. C. Allen and R. B. Snow. *American Ceramic Society, Journal,* v. 38, Aug. 1955, p. 264-280.

Phase equilibrium diagram determined for the liquidus surface of the portion of the system between fayalite, dicalcium silicate, wüstite and lime. Equilibria involving tricalcium silicate explain earlier observations on openhearth slags and furnace bottom refractories. Graphs, micrographs, diagrams, tables. 24 ref. (B21, M24)

153-B. The Production of Zirconium Chloride From Australian Zircon Sands. I. E. Newnham, Eleanor Rutherford and A. G. Turnbull. *Australian Journal of Applied Science,* v. 6, June 1955, p. 218-223.

Based on the Kroll process, setup is designed for small pilot plants; major components are a carbon tube resistor furnace and a Monel metal chlorinator. Graph, diagrams. 6 ref. (B14, Zr)

154-B. The Sedimentation of Suspensions of Spheres. R. L. Whitmore. *British Journal of Applied Physics,* v. 6, July 1955, p. 239-245.

Theoretical relationship between concentration and settling rate of solid, undeformable particles falling in a fluid. Micrographs, diagram, tables, graphs. 18 ref. (B14)

155-B. Flotation Tests on an Oxidized Lead-Zinc Ore From the Coeur D'Alene District, Idaho. Lewis S. Prater. *Idaho Bureau of Mines and Geology, Pamphlet No.* 104, July 1955, 12 p. + 3 plates.

Testing procedures and results. Extremely fine grinding would be necessary to liberate the minerals. Tables, micrographs. (B14, B13, Pb, Zn)

156-B. Recent Progress in the Design and Operation of Gold Reduction Plants. H. Britten. *South African Mining and Engineering Journal,* v. 66, pt. 1, July 9, 1955, p. 779 + 4 pages.

Sorting and crushing, sorting and disposal of wastes, ore storage, mill-

ing, concentration, recording instruments, product testing. 5 ref. (B13, B14, Au)

157-B. (German.) **Ore Beneficiation, Reduction, and Processing of Lead.** G. Heuser. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 675-682.

Elaborates on possible methods of treatment at the various steps of the operations. 7 ref. (B14, C general, Pb)

158-B. (Japanese.) **Studies on the Beneficiation of Domestic Manganese Ores.** Yuji Yamamoto, Tooru Ishihara, Tadaya Hoshino, Kenji Tomita, Hisanao Koizumi, Yasumichi Kagami and Kotaro Suzuki. *Resources Research Institute, Report, (Japan),* 1955, no. 24, June, 41 p.

Study to determine how much domestic ore, especially manganese carbonates and oxides, can be beneficiated by such processes as jigging, tabling and flotation. Tables, micrographs, graphs, photographs, diagrams. 92 ref. (B14, Mg)

159-B. **Marmora's Iron Goes to Market.** C. Mamen. *Canadian Mining Journal,* v. 76, Aug. 1955, p. 43-48.

Equipment and operating procedures of plant for the concentrating and pelletizing of magnetite ore. Photographs, flowsheet. 2 ref. (B14, B16, Fe)

160-B. **Agglomerating Iron Ore Concentrates.** R. B. Cooke and Thomas E. Ban. *Chemical Engineering Progress,* v. 51, Aug. 1955, p. 364-368.

Development of pelletizing, factors influencing balling, specific surface, nature of additives. Tables, graphs. 10 ref. (B14, B16, Fe)

161-B. **Heavy Density Flowsheets.** R. H. Lowe. *Mining Congress Journal,* v. 41, Aug. 1955, p. 43-46.

Processes using galena and magnetic media. Photograph, flowsheets. (B14)

162-B. (German.) **Transportation of Suspensions in the Mechernich Ore Beneficiating Plant.** Franz Zrenner. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 8, Aug. 1955, p. 359-367.

Characteristics, wear resistance, operating costs of pumps used for moving ore slurries. Tables, diagrams, photographs, graph. 7 ref. (B14)

163-B. **Some Contributions of Chemistry to the Winning of Metals.** E. L. Day. *Chemistry & Industry,* 1955, no. 31, July 30, p. 960-967.

Advances in ore location, ore dressing and extractive metallurgy as applied to gold, nickel, uranium, the platinum metals and other metals. Flowsheet. 3 ref. (B general, C general, Au, Ni, U, EG-c)

164-B. **Fairless Works Achieves Close Control in Mixing Fuel Gases.** Jack E. Webber. *Gas,* v. 31, Sept. 1955, p. 46-51.

Design at Fairless Works for maintaining a fixed heat flow factor with natural gas, plant-generated coke-oven gas and air in face of a variable demand. Table, graph, diagrams. (B18, A5, ST)

165-B. **Grevor Mine.** *Mine & Quarry Engineering,* v. 21, Sept. 1955, p. 366-376.

Concentration plant including crushing, washing, gravity concentration, table flotation, concentrate retreatment and slimes plant. Photographs, flowsheets. (B13, B14, Sn)

166-B. (Book.) **Symposium on Sinter.** Special Report No. 53. 200 p. 1955. Iron and Steel Institute, 4 Grosvenor Gardens, London, S.W. 1, England.

Seventeen papers covering the physics and chemistry occurring in a sinter bed, means of increasing the productivity of sinter plants, and the influence of sinter on economy of iron production in the blast furnace. Papers previously abstracted from preprints. (B16, D1, Fe)

167-B. **Vitro's Keys to Successful Uranium Leaching.** J. B. Huttl. *Engineering and Mining Journal,* v. 156, Sept. 1955, p. 100-105.

Refining process includes ore preparation, sulfuric acid leaching, decantation and clarification, precipitation, filtration and refining. Photographs, diagram. (B13, B14, U)

168-B. **Canadian Practice in Ore Dressing and Extractive Metallurgy of Uranium.** A. Thunaes. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/2, June 1955, 9 p.

Canadian ores being treated do not contain other values in sufficient amount to warrant their recovery and, consequently, the uranium must pay for cost of development, mining and milling. 10 ref. (B general, U)

169-B. **Metallurgical Coke 1939-1955.** J. Taylor. *Iron & Steel,* v. 28, Sept. 1955, p. 431-435.

Critical review of literature covering quality and properties of coke

and its use in blast furnaces and cupolas. 65 ref. (B22, D1, E10)

170-B. Iron and Steel Produced From Pyrrhotite Tailings Opens Up Potential Market. B. G. Hunt and A. Turner. *Journal of Metals,* v. 7, Sept. 1955, p. 944-947.

Iron sulfide concentrate, produced in separating lead and zinc from ore, is roasted to provide sulfur dioxide, and the iron oxide calcine is turned into pig iron. Photographs, tables. 1 ref.
(B14, B15, Fe, ST, EG, Zn, Pb)

171-B. Ore Blending at Shipping Dock Insures Uniform Blast Furnace Burden. Myron W. Griswold. *Journal of Metals,* v. 7, Sept. 1955, p. 956-969.

Because Minnesota ores are not uniform, methods of sampling from railroad cars and blending combination grades in cargo boats have been devised. Photograph, diagrams, tables. (B11, D1, Fe)

172-B. The Decomposition of Blast Furnace Raw Materials and Slags, Steelmaking Slags and Refractories for the Purpose of Chemical Analysis. E. W. Harpham. *Metallurgia,* v. 52, no. 310, Aug. 1955, p. 93-101.

Application of methods for decomposition. 144 ref.
(B19, B21, D general, ST)

173-B. Aerofall Mill Finds Increasing Application. Rixford A. Beals. *Mining Engineering,* v. 7, Sept. 1955, p. 842-845.

Materials that undergo dry grinding, without balls, include iron and gold ore, asbestos rock and slag. Tables, photographs, flowsheets, diagrams. (B13, Fe, Au)

174-B. (French.) **Contribution to the Study of the Physical Properties of Aluminum Oxides in Relation to the Conditions of Calcination of the Hydrated Alumina.** Lucia Braicovich and Fabrizia Landi. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 17-22; disc., p. 23.

Systematic tests of industrial calcination carried out at various temperatures. X-ray and microscopic examinations made on resultant product. Micrographs, tables, graphs. (B15, Al)

175-B. (Hungarian.) **Behavior of Stabilized Refractory Dolomite in Electric Furnaces.** Antal Szerelmy. *Kohaszati lapok,* v. 10, no. 8, Aug. 1955, p. 366-369.

Characteristics and behavior of furnace linings made with brick of Roumanian origin. Diagrams, tables, graphs. (B19)

176-B. (Russian.) **Effect of Alkali and Soda on the Flotation Properties of Sulfide-Free Minerals.** V. M. Borisov. *Khimicheskaia promyshlennost',* 1955, no. 4, June, p. 213-217.

Effect of pH on variation of electrokinetic potential of calcite, apatite, fluorite, dolomite, barite and others. Graphs, tables. 9 ref. (B14)

177-B. Classification in Hydrocyclones. George M. Darby. *American Ceramic Society Bulletin,* v. 34, Sept. 1955, p. 287-290.

History and development of liquid-solid cyclones and their operation as classifiers. Diagrams, tables. (B13)

178-B. Zirconium Metal Production. S. M. Shelton, E. D. Dilling and J. H. McClain. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/533, July 1955, 128 p.

Current status with a detailed account of production of reactor grade by Bureau of Mines. Tables, graphs, photographs, diagrams, flowsheet. 66 ref. (B general, C general, Zr, Hf)

179-B. Development of Chemical Treatment of Low-Grade Iron Ores at Appleby-Frodingham. L. Reeve. *Iron and Steel Institute, Journal,* v. 181, Sept. 1955, p. 26-40.

Cyclic process for distilling iron as pure ferric chloride, vanadium recovery, fluidizing techniques, thermodynamics and engineering problems. Diagrams, tables, photograph, graphs. 4 ref. (B14, Fe)

180-B. Sintered Ore—New Glow in Blast Furnace Economy. Thomas F. Hruby and Robert M. Love. *Steel,* v. 137, Sept. 26, 1955, p. 112-114.

Sinter plant has been found especially valuable because of need for more blast furnace hot metal, high cost of constructing new blast furnaces, increasing cost of coking quality coals and the forced shift to ores containing high percentages of fines. Photographs, graph.
(B16, D1, ST)

181-B. (Czech.) **Ferromanganese.** Rudolf Strubl and Oldrich Sedlacek. *Hutnické listy,* v. 10, no. 8, Aug. 1955, p. 462-469.

Economically compares the more important methods of production of the medium and low-carbon ferromanganese and manganese metal on the basis of the principal production costs (e.g., cost of the ore, the reduction coke, and electrical energy consumption). Map, tables, graphs, diagram. 4 ref. (B22, Fe, Mn)

182-B. (German.) **Limits of De-Phosphorization of Iron With Lime.** Ger-

hard Trömel and Willy Oelsen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 497-506.

Importance of construction of a phase diagram of the iron-phosphorus-oxygen-lime process, and allied difficulties. Role of temperature and of individual components, material of the crucible and slag formation and its constitution. Graphs, tables, phase diagrams, micrographs. 6 ref. (B21, P12, Fe)

183-B. (German.) **Observations on Investigation Methods in Study of Coking Ability of Coal.** Fritz Ulrich. *Gas- und Wasserfach,* v. 96, Ausgabe Gas, no. 17, Sept. 1, 1955, p. 557-560.

Results of experiments conducted by author of coking of different types of coal and their mixtures, with emphasis on the importance of coking coal lump size. Graphs. 6 ref. (B18)

184-B. (German.) **Thermic Aspects for the Use of Carbon Stones for Hearth Block and Hearth Casing of Furnaces.** Reinhold Baake and Joachim Tischendorf. *Metallurgie,* v. 5, no. 4, Apr. 1955, p. 123-127.

Economic use depends on carbon material of low thermal conductivity and high mechanical and chemical qualtity. Tables, diagrams, graphs. 3 ref. (B19, D1, C)

185-B. (German.) **Carbon Stones in Furnaces.** Joachim Holzhey. *Metallurgie,* v. 5, no. 4, Apr. 1955, p. 134-144.

Summary of opinions on usefulness, ways of mounting, cooling and heating newly set-up furnaces. Graphs, photographs, table, diagrams. 15 ref. (B19, D1, C)

186-B. Agglomerating Fine Sized Ores With Low Temperature Coke. C. E. Lesher. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Oct. 1955, p. 1114-1118.

Orcarb process agglomerates with very little carbon; ore-carbon pellets process, using coke as binder. Tables, graphs, photographs. (B14, Fe)

187-B. How a Pilot Plant Helps in Manganese Ore Processing Control. F. A. Fischer. *Industrial and Engineering Chemistry,* v. 47, Oct. 1955, p. 2073-2074.

Equipment and operation of pilot plant to provide testing conditions as close as possible to those existing in a 1200 tons per day mill. Flowsheets. 4 ref. (B14, Mn)

188-B. Preparation of High Purity $ZrCl_4$ From Alkali Chlorozirconates. Robert V. Horrigan. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Oct. 1955, p. 1118-1120.

Prepared by thermal decomposition of fused salts at 500 to 600° C. and at atmospheric pressure and used to introduce zirconium into magnesium alloys. Phase diagrams, tables. (B22, Zr, Mg)

189-B. The Measurement of Thermal Conductivity of Refractory Materials. W. D. Kingery and F. H. Norton. *Massachusetts Institute of Technology (U. S. Atomic Energy Commission),* NYO-6450, July 1955, 16 p.

Data reported over range from room temperature to 1000° C. for compositions in magnesia-silica system, for gadolinia-samaria solid solutions and for single crystals of rutile. Diagrams, graphs. (B19, P11, Ti, Sm, Gd, Si, Mg)

190-B. Uranium Mining on the Colorado Plateau. W. L. Dare, R. A. Lindblom and J. H. Soulé. *U. S. Bureau of Mines, Information Circular* 7726, Sept. 1955, 60 p.

Problems in mining ore bodies and in selection of development and mining methods. Map, graphs, photographs. (B12, U)

191-B. (Hungarian.) **Nomograms for the Determination of the Specific Gravity of Aluminate Liquors.** Béla Fogarasi. *Kohaszati lapok,* v. 10, no. 9, Sept. 1955, p. 419-423.

Construction of two nomograms for graphic determination of the specific gravity of pure liquors when the composition of the solution is known. Graphs, table, nomograms. (B14, P10, Al)

192-B. (Hungarian.) **New Data on Ore Preparation in Silicon-Thermal Magnesium Metallurgy.** Andor Szulyovszky and Karoly Czako. *Kothaszati lapok,* v. 10, no. 9, Sept. 1955, p. 413-419.

Crushing and calcining of dolomite, equipment, briquetting. Tables, graphs. 12 ref. (B13, B14, B15, B17, Mg, Si)

193-B. (Polish.) **Evaluation of the Work of Czechoslovak Coking Works and Blast Furnaces in the First Five-Year Plan.** A. Ofiok. *Hutnik,* v. 22, nos. 7-8, July-Aug. 1955, p. 265-271.

Figures, for the period from 1949 to 1953, on the utilization of native and foreign iron ores in Czech blast furnaces, including preparation, analysis and use of coke. Tables. 1 ref. (B22, D1, Fe)

194-B. Underground Mining of the Frodingham Ironstone Bed. C. Smith.

Iron and Steel Institute, Journal, v. 181, Oct. 1955, p. 150-158 + 4 plates.
Method replaces open cast mining of low-grade ore which has valuable self-fluxing properties for making pig iron. Diagrams, photographs, graph. (B12, CI)

195-B. Tubular Grinding Mills. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 27, Oct. 8, 1955, p. 89, 91-92.
Design, relative efficiency, use of classifiers, effects of different materials. (B13)

196-B. (Spanish.) **Reduction of Iron Ores Containing Titanium.** Otto Barth. *Instituto del hierro y del acero,* v. 8 no. 36, Apr.-June 1955, p. 149-158.
Separation of iron and titanium concentrates from ilmenite, rutile and titaniferous iron ores. Micrographs, table, graphs, photograph. (B14, Fe, Ti)

197-B. Removal of Copper From Iron-Copper-Carbon Melts by the Use of Sodium Sulfide Slags. Frederick C. Langenberg, Robert W. Lindsay and D. P. Robertson. *Blast Furnace and Steel Plant,* v. 43, Oct. 1955, p. 1142-1147.
Reducing copper content is necessary to improve fabrication by hot working and deep drawing. Tables, graphs. 6 ref. (B21, C, Fe, Cu)

198-B. Metallurgical Coke 1939-1955. II. Production. J. Taylor. *Iron & Steel,* v. 28, Oct. 1955, p. 469-474, 479.
Coal properties and carbonizing conditions on which formation depends. 68 ref. (B22)

199-B. Fluxing Practice for Aluminum Alloys. Walter N. Rossborough. *Precision Metal Molding,* v. 13, Nov. 1955, p. 41 + 6 pages.
Lists ten requirements for satisfactory fluxes and discusses reclamation, degassing and improvement fluxes. Micrographs. (B21, Al)

200-B. (German.) **A Study of the Problem of Extracting the Copper From Siegerland Sparry Ironstone.** Hubert Gleichmann. *Stahl und Eisen,* v. 75, no. 19, Sept. 22, 1955, p. 1233-1241.
Type, extent and results of present methods, further possibilities of extraction. Photographs, micrographs, graphs, diagrams, tables. 5 ref. (B14, Fe, Cu)

201-B. (German.) **Sizing of Lump Ores.** Herbert Pohl. *Stahl und Eisen,* v. 75, no. 20, Oct. 6, 1955, p. 1295-1300.
Effect of size on reduction in blast furnace, charge for sintering process, relationship between coke and ore size, comparison of round aperture and mesh wire screening methods. Tables, diagram. 2 ref. (B13, D1, Fe)

202-B. (Russian.) **Heating of Coal by High-Frequency Current.** S. G. Aronov and Iu. B. Tiutiunnikov. *Stal',* v. 15, no. 9, Sept. 1955, p. 771-776.
Rapid heating of coal charge with low energy loss up to the stage of transition of semicoke into coke; effect of appearance of electroconductivity in material on dielectric heating; semicoke obtained by this process compared with thermal-process coke. Graphs, diagrams, tables, photograph. 9 ref. (B18)

203-B. (Slovenian.) **Importance of the Solubility of Copper Oxide and Ferric Oxide in Acid and Ammonia Leaching Solvents for the Hydrometallurgy of Copper.** Krsto Cazafura and Boris Mejac. *Rudarsko-metalurski zbornik,* 1955, no. 2, p. 101-126.
To achieve the maximum solubility in water and in dilute acids for copper and the minimum for iron, sulfating roasting of sulfide copper ores must be done at 600 to 650° C. Tables, graphs, photographs. 6 ref. (B15, Cu, Fe)

SECTION C

NONFERROUS EXTRACTION and REFINING

1-C. High Vacuum Technique. Vacuum Refining; Materials of Construction; Ultra-High Vacuum Techniques; Gauges. S. L. Martin. *Chemical & Process Engineering,* v. 35, Oct. 1954, p. 301-305.

Dezincing of lead, system design and gaging reviewed. Table, graph, diagrams. 19 ref. (C25, S14, Pb)

2-C. Furnace Operation and Casting Improved at Copper Cliff. Joseph C. Bischoff. *Journal of Metals,* v. 6, Nov. 1954, p. 1194-1196.

Practices and equipment for continuous production of copper. Photographs, table. 2 ref. (C21, C5, Cu)

3-C. Thoughts on Lead Blast-Furnace Smelting. L. B. Haney and R. J. Hopkins. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1208-1213; disc., p. 1213.

Factors affecting blast furnace operation based on experimental data. Table, diagram, graphs. 5 ref. (C21, Pb)

4-C. (German.) **Removal of Aluminum From Zinc-Containing Copper Alloys.** Edmund R. Thews. *Giesserei,* v. 41, no. 21, Oct. 14, 1954, p. 571-573.

Review of literature on the removal of aluminum by oxidation, especially with the least loss of other components of the alloys. Tables. 18 ref. (C21, Cu, Zn, Al)

5-C. High-Vacuum, High-Temperature Furnace. *Edgar Allen News,* v. 33, Nov. 1954, p. 241-242.

Electrically heated carbon tube furnace designed for melting, annealing and sintering. Tables. (C21, J23, H15)

6-C. Advanacements in Induction Melting. G. W. Holz. *Industrial Heating,* v. 21, Nov. 1954, p. 2226 + 5 pages.

Types of induction melting furnaces. Advantages and principles and typical installations. Photographs, diagrams. (C21, D6)

7-C. A Review of Developments in the Melting, Refining, and Casting of Copper. H. J. Miller. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, 1954, p. 167-172.

Trends in metal supplies, new processes, continuous casting, gas reactions in refining. 19 ref. (C21, C5, Cu)

8-C. On the Way: More Zirconium for Nuclear Reactors. *Chemical Engineering,* v. 61, Dec. 1954, p. 112-114, 116.

Steps in the production and purification of zirconium sponge. Photographs, diagram. (C general, T25, Zr, Hf)

9-C. Chemical Engineering Aspects of Titanium Metal Production. R. L. Powell. *Chemical Engineering Progress,* v. 50, Nov. 1954, p. 578-581.

Raw materials, chlorination, purification procedures and reduction methods. Diagrams, table. 6 ref. (C general, Ti)

10-C. Equilibrium and Heat Effect of Aluminum Subchloride Reaction. P. Weiss. *Henry Brutcher, Altadena, Calif., Translation no.* 2949, 14 p. (From *Erzmetall,* v. 3, no. 8, 1950, p. 241-244.)

Exploration of possibility of producing high-purity aluminum from cheaper materials and of recovering pure aluminum from ore without the necessity of electrolysis. Graphs. 17 ref. (C2, Al)

11-C. Electrolytic Production of Ternary Alloys of Nickel With Iron and Molybdenum. T. F. Frantsevich-Zabludovskaya, I. N. Frantsevich and K. D. Modylevskaya. *Henry Brutcher, Altadena, Calif., Translation no.* 3389, 10 p. (Condensed from *Zhurnal Prik-*

ladnoi Khimii, v. 27, no. 4, 1954, p. 413-420.)

Previously abstracted from original. See item 127-C, 1954. (C23, Ni, Fe, Mo)

12-C. **Mechanism of Occurrence of Overvoltage at Carbon Anode in the Electrolyte Production of Aluminum.** S. I. Rempel and L. P. Khodak. *Henry Brutcher, Altadena, Calif., Translation no.* 3391, 15 p. (From *Zhurnal Prikladnoi Khimii,* v. 26, no. 9, 1953, p. 931-940.)

Previously abstracted from original. See item 38-C, 1954. (C23, Al)

13-C. (French.) **Reduction of Titanium Dioxide by Calcium Silicides. Preparation of Titanium Silicides.** William Freundlich, André Chrétien and Michel Bichara. *Comptes rendus,* v. 239, no. 18, Nov. 3, 1954, p. 1141-1143.

Use of calcium silicides as metallic oxide reducing agents to prepare silicon alloys. Preparation of Ti_5Si and $TiSi_2$. Tables. (C26, Ti)

14-C. **Direct Chill Continuous Casting of Magnesium Proves Practical, Economical.** R. K. Paddock. *Iron Age,* v. 174, Dec. 9, 1954, p. 149-151.

Equipment and processes for production of magnesium alloy ingots. Diagrams, photographs. (C5, Mg)

15-C. **Vacuum Melting Improves Alloy Properties and Workability.** R. K. McKechnie, D. W. Green and W. F. Moore. *Journal of Metals,* v. 6, Dec. 1954, p. 1364-1367.

Construction and operation of furnace; workability and mechanical properties of nickel-base alloy. Graphs, photographs, tables, micrograph. 4 ref. (C25, Q23, Ni, Cr)

16-C. **Vacuum Melting—Commercial and Experimental.** *Metal Progress,* v. 66, Dec. 1954, p. 113-114.

Review of papers presented at 106th meeting of the Electrochemical Society. (C25)

17-C. (German.) **Remelting Zinc and Copper Cathodes in Large Electrically Heated Furnaces.** J. Tostmann. *Metall,* v. 8, nos. 21-22, Nov. 1954, p. 853-857.

Equipment and practices. Diagram, photographs, charts. 4 ref. (C21, A8, Zn, Cu)

18-C. (Czech.) **New Method of Producing Aluminum-Magnesium Alloys.** Adolf Valasek. *Slévarenstvi,* v. 2, no. 9, Sept. 1954, p. 265-267.

Advantages of using Al-Mg master alloys with 10-35% Mg. Graph, table. (C general, Al, Mg)

19-C. (Hungarian.) **The Effect of the Casting Skin on Aluminum Ingots Cast Into Water on the Properties of Plates Prepared From Them.** Andras Domony and Rezsö Varhelyi. *Kohaszati Lapok,* v. 9, no. 11, Nov. 1954, p. 505-508.

Hungarian investigations on high-purity, continuously cast ingots. Experimental details, results of microscopic and corrosion resistance tests. Evaluation of results. Diagram, micrographs, tables. 6 ref. (C5, R general, Al)

20-C. **Tantalum and Niobium. Separation by Liquid-Liquid Extraction.** Joseph R. Werning and Kenneth B. Higbie. **Anhydrous Separation.** S. L. May, A. W. Henderson and H. A. Johansen. **Ductile Tantalum by Kroll Process.** H. A. Johansen and S. L. May. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2491-2500.

Strong hydrochloric acid extraction of tantalum from anhydrous pentachlorides in mixed ketones, enhanced by ferric chloride. Separation by selective chlorination of partially hydrolyzed chlorides for 99% purity. Magnesium reduction of tantalum pentachloride and distillation of magnesium chloride. Graphs, tables. 55 ref. (C2, C26, Ta, Nb)

21-C. **The Development of Melting Techniques for Titanium and Zirconium.** G. L. Miller. *Industrial Chemist and Chemical Manufacturer,* v. 30, Dec. 1954, p. 577-584.

A review; 13 systems diagrammed and explained. Photograph. 17 ref. (C general, Ti, Zr)

22-C. **The Electrodeposition and Refining of High-Grade Chromium.** H. T. Greenaway. *Institute of Metals, Journal,* v. 83, Dec. 1954, p. 121-125.

Apparatus, materials and processes for production of high-purity chromium. Tables, graph, diagram. 9 ref. (C23, Cr)

23-C. **The Role of the Electric Arc Furnace in Utilizing Some Strategic Off-Grade Ores.** Lloyd H. Banning. *Electrochemical Society, Journal,* v. 101, Dec. 1954, p. 613-621.

Use of a dry-top, arc-resistance, electric smelting technique, and smelting test data. Relationship between theoretical smelting efficiency and slag-to-metal ratio. Tables, graphs. 10 ref.

(C21, Ni, Mn, Fe, Cr, Al, Si)

24-C. (Czech.) **Preparation of Zirconium and Zirconium Hydride for Vacuum Refining.** Frantisek Plzak. *Hutnické Listy,* v. 9, no. 11, Nov. 1954, p. 650-655.

Equipment and processes for producing zirconium from zircon. Diagrams, photographs, micrographs. 10 ref. (C25, Zr)

25-C. (Polish.) **Flux Method of Refining Copper Alloys.** K. Rutkowski. *Prace Instytutu Odlewnictwa,* v. 3, no. 2, 1953, p. 68-75.

Effects of flux and fluxing methods on mechanical properties of copper and copper alloy castings. Tables, micrographs, graphs. (C21, Q general, Cu)

26-C. Progress in European Vacuum Melting Described. H. H. Scholefield. *Journal of Metals,* v. 7, Jan. 1955, p. 25-27.

Improvements in pumping equipment and furnace design. Photograph, graphs, diagram. 5 ref. (C25)

27-C. Electric Furnace Melting Practice. Warren A. Sheaffer. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 33-38.

Equipment and practices for producing tough-pitch copper. Diagrams, photographs, graph, tables. 2 ref. (C21, Cu)

28-C. (Hungarian.) **The Current Efficiency in Aluminum Electrolysis. II.** Gyula Szekér. *Kohaszati Lapok,* v. 9, no. 6, June 1954, p. 256-261.

Effect of V_2O_5, P_2O_5, Fe_2O_3, TiO_2 and SiO_2 on current consumption. Tables, graphs. 14 ref. (C23, Al)

29-C. (Hungarian.) **Manufacturing Experience of Production of Vanadium, With Respect to the Problems of Producing High-Purity V_2O_5.** Endre Bogardi. *Kohaszati Lapok,* v. 9, no. 6, June 1954, p. 261-266.

Plant operations and manufacturing technology; conditions for large-scale production; possibilities for processing strongly contaminated vanadium muds. Tables, photographs. (C general, V)

30-C. (Hungarian.) **Influence of Various Factors on the Life Span of Aluminum-Electrolysis Vats.** A. I. Bjeljajev. *Kohaszati Lapok,* v. 9, no. 6, June 1954, p. 274-278.

Effect of quality of carbon-briquette lining, design of vat, quality of electrical connections, method and duration of heating-up of vat, peculiarities of starting vat, operation after starting and working conditions during operation. Diagram. (C23, Al)

31-C. Preparation of Actinium Metal. Joseph G. Stites, Jr., Murrell L. Salutsky and Bob D. Stone. *American Chemical Society, Journal,* v. 77, Jan. 5, 1955, p. 237-240.

Radioactive metal prepared by lithium reduction of actinium fluoride. Tables. 18 ref. (C26, Ac)

32-C. This is Magnesium. L. M. Pidgeon. *Canadian Metals,* v. 18, Jan. 1955, p. 20, 22, 24-25.

Pidgeon process and its application in Canada. Uses and properties of magnesium. (C26, T general, Mg)

33-C. Preparation of Tri- and Tetra-Chlorides of Titanium. N. N. S. Siddhanta, K. R. Shenoy and B. B. Dey. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Oct. 1955, p. 30-32.

Laboratory method capable of producing 2 to 3 g. per hr. of anhydrous trichloride. Diagram. 14 ref. (C23, Ti)

34-C. Purification of Gallium by Zone-Refining. D. P. Detwiler and W. M. Fox. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 205.

Combination of acid leaching and zone refining used to produce high-purity specimens. Table, photograph. 6 ref. (C5, Ga)

35-C. (French.) **Desulfurization of Tin Bronzes by Sodium or Magnesium.** Marcel Cirou and Pierre-Julien Le Thomas. *Fonderie,* 1954, no. 107, Dec., p. 4281-4284.

Evaluation of processes. Tables. (C26, Mg, Sn, Cu, Na)

36-C. The Preparation of Polonium Metal and Polonium Dioxide. K. W. Bagnall and R. W. M. D'Eye. *Chemical Society, Journal,* 1954, Dec., p. 4295-4299.

Milligram quantities used mostly in X-ray and spectral studies of Polonium-210. 17 ref. (C general, Po)

37-C. Electrolytic Preparation of Molybdenum From Fused Salts. IV. Preparation of Reduced Molybdenum Chlorides From Molybdenite Concentrate. Seymour Senderoff and Roger J. Labrie. *Electrochemical Society, Journal,* v. 102, Feb. 1955, p. 77-80.

Chlorinating and subsequent reduction in aqueous and nonaqueous solutions. Tables, diagram. 4 ref. (C23, Mo)

38-C. An Attempt to Separate Titanium From Oxygen by Vacuum Sublimation, and Some Measurements of Evaporation Rates. A. B. Osborn. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 185-188.

Increased oxygen content reduced evaporation rate. Condensed titanium contained much less oxygen than the starting alloy but process is not economically feasible for industrial purification. Graph, diagram, tables. 3 ref. (C25, Ti)

39-C. Vacuum Melting. R. K. McKechnie, D. W. Green and W. F. Moore. *Metal Industry,* v. 86, Jan. 21, 1955, p. 49-50.

Future operation. Improved properties of gas-free ingots. Graphs. 3 ref. (C25, D8)

40-C. Electrolytic Recovery of Silver From Fixing Baths at Low Current Density. A. A. Rasch and J. I. Crabtree. *Photographic Science and Technique,* v. 2, Feb. 1955, p. 15-33.

Use of small recovery units. Economics of silver recovery. Photographs, graphs, tables. 20 ref. (C23, Ag)

41-C. The Preparation of Samarium Metal With Calcium. E. I. Instott. *American Chemical Society, Journal,* v. 77, Feb. 5, 1955, p. 812-813.

Samarium oxide (Sm_2O_3) is reduced by calcium metal and the samarium distilled in tantalum containers under vacuum or argon. Table. 4 ref. (C22, Sm)

42-C. Continuous Multistage Separation by Zone-Melting. W. G. Pfann. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 297-303.

Description of *zone-void* modification of the zone-melting process which uses a vertical column through which voids are passed by moving heaters. Diagrams, tables, graphs. 10 ref. (C5)

43-C. (English.)**On the Production of Pure Silicon.** Kenji Ono and Tomoo Matsushima. *Science Reports of the Research Institutes, Tohoku University* ser. A, v. 6, no. 5, Oct. 1954, p. 477-496.

Production of pure silicon by the reduction of silicon tetrachloride with zinc. Tables, graphs, diagrams. 10 ref. (C26, Si)

44-C. (German.) **Modern Methods of Casting Light-Metal Ingots.** Vincenz Fuss. *Giesserei,* v. 42, no. 2, Jan. 20, 1955, p. 25-35.

Ingot casting methods; equipment for intermittent and continuous casting. Diagrams, graphs, tables. 20 ref. (C5, Al, Mg)

45-C. (German.) **Computing the Specific Skin Resistance of a Compounded Melting Charge.** W. H. Scheibe. *Metall,* v. 9, nos. 3-4, Feb. 1955, p. 121-123.

Derivation of two formulas for computing specific resistance of melt and conducting crucible in induction furnaces. Diagram, graph, table. (C21, D6)

46-C. (German.) **Contributions to Chemistry of the Elements Columbium and Tantalum. XIV. A New Production Method by Dissociating Columbium-Tantalum Mixtures.** Harald Schäfer and Margot Jori. *Zeitschrift für anorganische und allgemeine Chemie,* v. 277, no. 6, Dec. 1954, p. 341-348.

Reducing homogeneous mixtures of the pentoxides with moist H_2 results in a tantalum-rich $(Cb, Ta)_2O_5$-phase and a columbium-rich $(Cb, Ta)O_2$-phase. Graphs, tables. 14 ref. (C2, Co, Ta)

47-C. (German.) **Zone Melting of Aluminum Antimonide.** Hans Achim Schell. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 58-61.

Method of purifying aluminum-antimony to improve semiconducting properties. Graphs, diagram, photograph. 9 ref. (C5, Al, Sb)

48-C. (Russian.) **Electrolytic Oxidation of Carbon in Cryolite-Alumina Melts.** L. N. Antipin and A. N. Khudiakov. *Doklady Akademii Nauk SSSR,* v. 100, no. 1, Jan. 1, 1955, p. 93-96.

Relation of anode potential and gas composition changes to current density. Graphs. 7 ref. (C23, Al)

49-C. (Russian.) **Formation at the Cathode of Aluminum and Sodium Subcompounds During Electrolysis of Cryolite Melts.** L. N. Antipin. *Doklady Akademii Nauk SSSR,* v. 99, no. 6, Dec. 21, 1954, p. 1019-1022.

Cathode potential and current strength. Formulas derived from experimental data. Graphs. 5 ref. (C23, Al)

50-C. (German.) **Tungsten and Molybdenum in Vacuum Technique.** R. Palme. *Planseeberichte für Pulvermetallurgie,* v. 1, no. 2, Feb. 1953, p. 61-71.

Vacuum melting, properties and uses in electric and electronics industry. Photographs, tables, graph, diagrams. 13 ref. (C25, T1, W, Mo)

51-C. (Book.) **Physical Chemistry and Metal Extraction.** D. W. Hopkins. 232 p. 1954. J. Garnet Miller Ltd., 54 Victoria Street, London, S.W.1, England. 30s. MacMillan Co., 60 Fifth Ave., New York 11, N. Y. $4.80.

Reactions between metallic compounds, metals, and slags of interest to students and operating personnel in metal extraction processes. (C general, D general)

52-C. (Hungarian.) **Production of High-Purity Aluminum.** Endre Balazs. *Kohaszati Lapok,* v. 10, no. 1, Jan. 1955, p. 17-20.

Production methods; furnace and electrode design; advantages of applications. Diagrams, table. 6 ref. (C23, Al)

53-C. (Hungarian.) **Past, Present, and Future in Hungarian Nonferrous Metallurgy.** Laszlo Jakoby. *Kohaszati Lapok,* v. 10, no. 2, Feb. 1955, p. 91-106.

Production processes and facilities for gold, silver, platinum, copper, lead, zinc, manganese, titanium and nonferrous scrap development. Table. (C general, Au, Ag, Pt, Cu, Pb, Mn, Ti)

54-C. (Russian.) **Treatment of Al-13 Alloy by Potassium Fluorozirconate Under a Stream of Nitrogen.** L. O. Sokolovskii and A. G. Kapalin. *Liteinoe Proizvodstvo,* 1955, no. 2, Feb., p. 10-12.

Method of producing high-strength aluminum-magnesium alloy. (C26, Al)

55-C. **The Extraction and Purification of Scandium.** R. C. Vickery. *Chemical Society, Journal,* 1955, Jan., p. 245-251.

Crude is extracted from wolframite and thortneitite and refined by ion exchange. Hydrazine-*NN'*-diacetate solution is selective for scandium. Graphs, chromatograms. 20 ref. (C general, B general, Sc)

56-C. **Characteristics of the Molybdenum-Depositing Arc and the Metal-Arc Melting Process.** A. R. Moss. *Institution of Electrical Engineers, Proceedings,* v. 102, pt. A, no. 1, Feb. 1955, p. 45-55.

Behavior of the arc during melting in vacuum or argon atmosphere; influence of arc variables on ingot quality. Diagrams, tables, graphs, photographs. 19 ref. (C21, Mo)

57-C. **The Choice and Construction of Monolithic Linings for Twin-Bath Induction Furnaces for Melting Aluminium Alloys.** E. J. Thackwell. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 283-294 + 1 plate.

Development of a densely rammed, fully monolithic lining, formed and fired *in situ.* Diagrams, graph, photograph. (C21, Al)

58-C. **The Use of Refractories in Low-Frequency Induction Furnaces for Melting Copper Alloys.** Maurice Cook, C. L. M. Cowley and E. R. Broadfield. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 295-305 + 4 plates.

Advantages of melting in induction furnaces and features of furnace design; operations which affect the use of refractories. Diagrams, tables, photographs, graphs. 5 ref. (C21, Cu)

59-C. **Aluminium Melting Furnaces.** Herbert Capitaine. *Metal Industry,* v. 86, Feb. 18, 1955, p. 125-127.

Factors to be considered is selecting the size and type of furnace. Diagrams. 3 ref. (C21, Al)

60-C. (French.) **Contribution to the Study of the Electrolysis of Pure Cryolite and Cryolitic Solutions of Alumina.** Pierre Mergault. *Comptes rendus,* v. 240, no. 7, Feb. 14, 1955, p. 765-767.

Measures decomposition voltage of Al_2O_3 solutions in melted cryolite. Diagram. 5 ref. (C23, Al)

61-C. **Refining Bismuth by Distillation and Chlorination.** R. R. Rogers and R. A. Campbell. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 515, Mar. 1955, p. 121-123; disc., p. 123-126; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 71-76.

Laboratory procedures and results. Diagrams, tables, graphs. 10 ref. (C22, C4, Bi)

62-C. **The Extractive Metallurgy of Zirconium by the Electrolysis of Fused Salts. III. Expanded Scale Process Development of the Electrolytic Production of Zirconium From K_2ZrF_6.** Bertram C. Raynes, Edward L. Thellmann, Morris A. Steinberg and Eugene Wainer. *Electrochemical Society, Journal,* v. 102, Mar. 1955, p. 137-144.

Pilot plant experience indicates further expansion to larger scale operation should be feasible. Photographs, diagrams, tables, graphs. 3 ref. (C23, Zr)

63-C. **Fuming of Zinc From Lead Blast Furnace Slag.** R. C. Bell, G. H. Turner and E. Peters. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Mar. 1955, p. 472-477.

Thermodynamic study of zinc recovery reactions. Graphs, tables. 10 ref. (C21, Zn)

64-C. (English.) **Fundamental Studies on Copper Smelting. II. Solubilities of Constituents of Matte in Slag.** Akira Yazawa and Mitsuo Kameda. *Technology Reports, Tohoku University,* v. 19, no. 1, 1954, p. 1-22.

Determination of chemical solubilities of constituents of matte. Graphs, diagrams, tables, micrographs. 20 ref. (C21, Cu)

65-C. **Production of Zirconium Alloys by Consumable Electrode Arc Melting.** R. A. Beall, J. O. Borg and H. L. Gilbert. *Electrochemical Society, Journal,* v. 102, Apr. 1955, p. 187-192.

Equipment and conditions of operation involved in double melting; discussion of homogeneity, purity, and effective yield. Diagrams, tables, photographs. 10 ref. (C21, Zr)

66-C. **Attempts to Improve Aluminum Reduction Since Héroult and Hall.** A. von Zeerleder. *Institute of Metals, Journal,* v.83, Mar. 1955, p. 321-328.

Surveys attempts made during the last 60 yr. to find improved method of producing aluminum on commercial scale. It is concluded that none can compete economically with the most modern version of the Hall-Héroult-Bayer process. Diagrams, tables, flowsheets. (C general, Al)

67-C. **Large Molybdenum Ingots by Arc Casting.** Norman L. Deuble. *Metal Progress,* v. 67, Apr. 1955, p. 87-90.

Manufacture of high-purity molybdenum powder, its continuous formation into a consumable electrode, and its arc melting in a high vacuum into half-ton ingots of theoretical density. Photographs, diagram, table. (C5, Mo)

68-C. **Electrolytic Cell for Titanium.** B. W. Whitehurst. *Steel,* v. 136, Apr. 18, 1955, p. 107.

Plated on starting wire from low temperature molten salt in which rutile or ilmenite is dissolved. Diagram. (C23, Ti)

69-C. **Practical Experiences With Continuous D. C. Casting of Light-Metal Alloys.** K. E. Mann. *Henry Brutcher Translation No.* 3463, 21 p. (From *Aluminium,* v. 29, no. 12, 1953, p. 497-508.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 33-C, 1954. (C5, Q general, Al, Mg)

70-C. **Investigations Into the Aluminothermy of Manganese.** K. Giesen and W. Dautzenberg. *Henry Brutcher Translation No.* 3464, 11 p. (Slightly condensed from *Archiv für Metallkunde,* v. 2, no. 2, 1948, p. 49-53.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 2C-26, 1949. (C26, Mn)

71-C. (Italian.) **The Use of Induction Furnaces for the Melting of Aluminum Alloys.** A. Tagliaferri and C. Barbazanges. *Alluminio,* v. 24, no. 1, Jan. 1955, p. 17-28.

Thermic efficiency of such furnaces. Diagrams, photographs, tables. (C21, Al)

72-C. **Preliminary Investigation of Hafnium Metal by the Kroll Process.** H. L. Gilbert and M. M. Barr. *Electrochemical Society, Journal,* v. 102, May 1955, p. 243-245.

Process from oxide to metal stages given with thermodynamic values for chlorination and reduction. Metal produced to date is hot malleable but not cold ductile. Photographs, table. 13 ref. (C26, Hf)

73-C. **Electrolytic Reduction of Titanium Monoxide.** M. E. Sibert, Q. H. McKenna, M. A. Steinberg and E. Wainer. *Electrochemical Society, Journal,* v. 102, May 1955, p. 252-262.

Electrolytic method for preparation of titanium metal from titanium monoxide. Photographs, tables, graphs, micrographs. 45 ref. (C23, Ti)

74-C. **Melt-Quality Tests for Light Alloys.** J. Wood. *Foundry Trade Journal,* v. 98, Apr. 14, 1955, p. 397-400.

Test criteria are simple and easy to operate, give results quickly, must be accurate and inexpensive. Photographs, diagram. 3 ref. (C21)

75-C. **Carbon Materials Required in Electrolytic Reduction of Alumina.** S. W. Martin and H. W. Nelson. *Journal of Metals,* v. 7, Apr. 1955, p. 540-543.

Conversion of alumina to metallic aluminum by electrolytic reduction. Flowsheets, diagrams, table, photographs. 10 ref. (C23, Al)

76-C. **Reclaiming Zirconium Chips for Arc-Melting Feed Stock.** *Metallurgia,* v. 51, no. 306, Apr. 1955, p. 179-180.

Removal of cutting oils, adhered contaminants and oxygen contamination; preparation of melting stock; arc melting of ingots. Tables. (C21, A8, Zr)

77-C. (Hungarian.) **Possibilities for Improving the Ampere Efficiency in Aluminum Electrolysis.** Pal Nagy. *Kohaszati Lapok,* v. 10, no. 3, Mar. 1955, p. 124-130.

Effects of increasing or stabilizing bath temperature, distance between the poles, composition of the bath, alumina concentration and of the increase in current density. Graphs. (C23, Al)

78-C. (Japanese.) **Studies on the Improvement of the Hydrometallurgy of Gold and Silver Ores.** Renpei Sei, Hideo Akutsu and Giichi Nishikido. *Resources Research Institute, Reports (Japan),* 1955, no. 19, Mar., 27 p.

Results of cyanidation test on the gold and silver ores from Oguchi mine, in Japan. Graphs, tables. 3 ref. (C24, Au, Ag)

79-C. **Continuous Casting of Aluminum in a Grooved Mold.** R. Irmann. *Henry Brutcher Translation No.* 2928, 4 p. (From *Giesserei, Technisch-Wissenschaftliche Beihefte,* 1952, nos. 6-8, p. 393-394.) Henry Brutcher, Altadena, Calif.

Occurrence of cold shuts and particulars on mechanism of formation; relationship between cold shuts and surface tension of molten metal. Photographs, diagrams. (C5. P10. Al)

80-C. (English.) **Design and Operation of Reactors for Titanium Production.** L. Gillemot. *Acta Technica Academiae Scientiarum Hungaricae,* v. 10, nos. 1-2, 1955, p. 221-245.

Construction and operating experience with large reactor for use in the Kroll method of titanium production. Diagrams, photographs, graphs, tables. 15 ref. (C26, Ti)

81-C. **Chemical Aspects of the Atomic Industry.** E. Glueckauf. *Endeavour,* v. 14, Apr. 1955, p. 83-89.

Production of plutonium; chemical separation during recycling; disposal of fission products; utilization of fission products in the future. Tables, graphs, flow diagrams, photographs. 5 ref. (C general, T general, Pu, U)

82-C. **Preparation of Titanium by Kroll's Process.** R. Manocha, P. P. Bhatnagar and T. Banerjee. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 81-94.

Results of investigation carried out for determining the optimum condition for the production of titanium. Diagrams, tables. 8 ref. (C26, Ti)

83-C. **Melting Furnaces for Non-Ferrous Metals. II.** W. A. Darrah. *Industrial Heating,* v. 22, Apr. 1955, p. 726 + 4 pages.

Types of furnaces described. Photographs. (To be continued) (C21)

84-C. **Experimental Production of Al-Si Alloys in a Three-Phase Furnace.** Lloyd H. Banning and William F. Hergert. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 630-633.

Advantages of a smelting technique utilizing hogged wood waste as part of the reductant and for temperature control. Tables. 13 ref. (C21, Al, Si)

85-C. **Hydrometallurgy of Copper-Zinc Concentrates.** Hidesaburo Kurushima and Suketoshi Tsunoda. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 634-638.

Recovery of both the copper and zinc by roasting in a fluidized bed. Tables, flowsheet. (C21, Zn, Cu)

86-C. **British Furnace Developments.** D. Llewellyn. *Metal Industry,* v. 86, Apr. 29, 1955, p. 339-344.

Advantages and disadvantages of furnaces for melting and heat treating. Table. photographs. (C general, D general, T general)

87-C. (German.) **High-Vacuum Furnaces.** Werner Scheibe. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 242-253.

Structural characteristics, fields of application. Photographs, diagrams, table. 13 ref. (C25, D8)

88-C. **Indirect Arc Furnace Reduces Costs With Rapid, Efficient Melting.** O. P. Toneguzzo. *Canadian Metals,* v. 18, May 1955, p. 29, 32.

Equipment and operating details of furnace used for nonferrous metals. (C21)

89-C. **The Oxygen Flash Smelting Process of the International Nickel Company.** *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 517, May 1955, p. 292-300; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 158-166.

A process developed for autogenous smelting of fine sulphides. Diagrams, tables, graphs, photographs. 17 ref. (C21)

90-C. **The German Lead Smelters.** C. W. Jensen. *Mining Magazine,* v. 92, May 1955, p. 265-277.

Review of equipment, practice and processes. Tables. (C21, Pb)

91-C. (German.) **Technical Preparation of Substances in Pure Condition. Demonstrated on Semifinished Germanium.** F. W. Dehmelt. *Chemie-Ingenieur-Technik,* v. 27, no. 5, May 1955, p. 275-278.

Zone melting process for the preparation of germanium in pure condition. Table, diagrams, graphs. 6 ref. (C5, Ge)

92-C. (Swedish.) **Swedish Shale as Raw Material for Uranium.** Erik Svenke. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning,* v. 26, no. 3, 1955, p. 75-80.

Amount of uranium that can be extracted from Swedish shale and principal flow sheet for uranium

production from shale. Diagram, tables, photograph. 1 ref.
(C general, U)

93-C. Zone-Melting. William G. Pfann and Karl M. Olson. *Bell Laboratories Record,* v. 33, June 1955, p. 201-205.

Process being used extensively in commercial production of ultra-pure germanium. Method is being applied on a laboratory scale to a host of other materials. Photographs, diagrams, graph. (C5, Ge)

94-C. Aluminum and Its Ores. V. A. Eyles. *Discovery,* v. 16, June 1955, p. 251-255.

Popular history of aluminum production and details of cryolite and bauxite geology. Table, diagrams, photographs. (C23, B10, Al)

95-C. Recent Innovations in the Control and Operation of Zirconium Reduction Furnaces. F. E. Block and A. D. Abraham. *Electrochemical Society, Journal,* v. 102, June 1955, p. 311-315.

Recent trends in automatic furnace control and instrumentation. Diagrams, table. 8 ref. (C21, Zr)

96-C. Preparation of Titanium by Fluoride Electrolysis. M. A. Steinberg, G. S. Carlton, M. E. Sibert and E. Wainer. *Electrochemical Society, Journal,* v. 102, June 1955, p. 332-340.

Preparation of commercially pure metal powder by electrolysis of K_2TiF_6 in molten sodium chloride. Operating conditions of the electrolysis and their effect upon the metal so produced. Photographs, graphs, micrographs, tables, diagrams. 12 ref. (C23, Ti)

97-C. Melting Furnaces for Non-Ferrous Metals. III. W. A. Darrah. *Industrial Heating,* v. 22, May 1955, p. 966, 968, 970, 972.

Refractories, burners and furnace melting, installation problems. (C21)

98-C. Vapour Phase Production of Titanium. C. J. V. Denning. *Metal Industry,* v. 86, May 13, 1955, p. 395-398.

Experimental work carried out on invention which may be basis of a continuous reduction process. Tables, diagram, photographs. 2 ref. (C4, Ti)

99-C. New Developments in Titanium Extraction. J. P. Levy. *Metal Industry,* v. 86, May 20, 1955, p. 415-418.

Features of vapor phase reduction of titanium tetrachloride by magnesium that makes it a possible successor to the established liquid phase process. Photograph, diagrams. 4 ref. (C4, Ti)

100-C. (Hungarian.) **Rapid Determination of the Sodium Content of Cryolite and the Cryolite Bath.** Györgyné Posgay. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 231-232.

Electrodialytic method applied after elimination of fluorine. Table. 8 ref. (C23)

101-C. Install Vacuum Setup for Dual Melting Role. W. G. Patton. *Iron Age,* v. 175, June 23, 1955, p. 95-97.

Semi-continuous 100-lb. vacuum induction melting furnace. Close control of oxygen and nitrogen content and ability to make alloy additions under vacuum conditions will aid the development of new high-temperature alloys. Diagram, photographs. (C25, SG-h)

102-C. Oxygen Flash Smelting Swings Into Commercial Operation. *Journal of Metals,* v. 7, June 1955, p. 742-750.

Copper flotation concentrate and flux are injected horizontally with oxygen into a specially designed reverberatory furnace, and smelting temperature is maintained solely by the flash combustion of iron and sulphur while the particles are in suspension. Photographs, diagrams, tables, graphs. 17 ref. (C21, Cu)

103-C. Thirty-One Year Old Furnace Bottom Yields Copper Bonanza. Harold Foard. *Journal of Metals,* v. 7, July 1955, p. 793-795.

History of the furnace, removal of the slag bottom, analysis of the slag, installation of the new bottom. Tables, diagrams. (C21, Cu)

104-C. Carbon Bonded Silicon Carbide Crucibles Offer Outstanding Advantages. G. J. Easter. *Journal of Metals,* v. 7, July 1955, p. 805-810.

Crucibles can be put directly into a hot furnace without pre-annealing or preheating, a charge of cold metal can also be charged into the hot crucible and full heat applied without hesitation. Other advantages. Photographs, tables.
(C21, E10, Al, Cu)

105-C. Processing of Zinc Oxide Fume at Flin Flon, Manitoba. Roy Ellerman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p.813-822.

Includes roasting for fluorine elimination and counter-current leaching to produce a neutral sulphate solution. This solution is combined with zinc sulphide leach solution for subsequent purification and electrolysis. Photograph, diagrams, graphs, tables, flowsheets. 2 ref.
(C23, B14, Zn)

106-C. Preparation of Pure Titanium. *Light Metals,* v. 18, June 1955, p.175-176.

Application of a process known as "catalytic distillation" to the extraction and purification of titanium and aluminum. (C22, Ti, Al)

107-C. Progress in the Extraction of Aluminum. L. V. Chilton. *Metal Industry,* v. 86, June 3, 1955, p. 457-459.

Reduction processes, furnace design and operation, purity of product, power supply, plant locations. Photographs, diagrams. 11 ref. (C general, Al)

108-C. Extraction Metallurgy. Graham Oldham. *Mining Journal (Annual Review),* May, p. 127, 129, 131, 133.

Developments in nonferrous reduction processes and refining techniques. Photographs. 26 ref. (C general)

109-C. On Some Problems of High-Vacuum Metallurgy. W. Scheibe. *Henry Brutcher Translation No.* 3488, 6 p. (Abridged from *Metall,* v. 7, nos. 19-20, 1953, p. 751-754.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 171-C, 1953. (C25, J23, H15, Al, Cu, Fe, Ti, Ag, Pt)

110-C. (Italian.) **Efficiency of Induction Furnaces for the Melting of Pig Iron and Steel, Copper Alloys, and Aluminum and Its Alloys.** G. Aldo Tagliaferri. *Fonderia,* v. 4, no. 4, Apr. 1955, p. 155-161.

Compares various types of induction furnaces; effects of low and high frequencies and crucible-type; energy equations. Photographs, diagrams, tables. (C21, D6, CI, ST, Cu, Al)

111-C. (Polish.) **Refining of Metallurgical Lead.** Kazimierz Doniec. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p.51-56.

Chemical compositions of leads prepared in foundries at home and abroad. Removal of copper, detinning, dezincing, elimination of arsenic and antimony. Tables, diagrams. (C21, Pb)

112-C. (Polish.) **Fire Refining of Copper.** Kazimierz Kurski. *Wiadomosci Hutnicze,* v. 11, no. 3, Mar. 1955, p. 72-78.

Types of copper ores appropriate for fire refining and impurities contained; behavior of impurities during refining. Graphs. 5 ref. (C21, Cu)

113-C. (Polish.) **Eliminating the Noble Metals.** Kazimierz Doniec. *Wiadomosci Hutnicze,* v. 11, no. 3, Mar. 1955, p. 84-88.

Methods of refining lead to eliminate small amounts of silver, gold and zinc by electrolytic refining, liquation and distillation. Resulting chemical compositions of refined leads. Table, diagrams, graphs. (C23, C22, C28, Pb)

114-C. Basic Problems in the Processing of Nuclear Fuels. III. A. M. Aikin. *Chemistry in Canada,* v. 7, July 1955, p. 44-46, 48.

In the processing of irradiated nuclear fuels, an attempt is made to answer the questions of what must be processed and in what manner, why process it, and disposition of the wastes. Graphs. (C28, UR, Pu)

115-C. Bomb Reduction of Molybdenum Trioxide by Calcium Metal. H. L. Gilbert and F. E. Block. *Electrochemical Society, Journal,* v. 102, July 1955, p. 394-398.

Production of 25-lb. reguli; joining of reguli as a consumable electrode in arc melting to produce ingot; hot forging and rolling to desired form. Photographs, diagrams, micrographs, table. 9 ref. (C26, F22, F23, Mo)

116-C. (French.) **Obtaining Boron by Igneous Electrolysis.** J. L. Andrieux and W. J. Deiss. *Bulletin de la société chimique de France,* 1955, no. 6, June p. 838-841.

Experimental study of 29 electrolytic baths of various composition for obtaining boron. Tables. 9 ref. (C23, B)

117-C. (French.) **Preparation of Germanium by Fused Electrolysis.** Jean-Lucien Andrieux and Marie-Jeanne Barbier Andrieux. *Comptes redus,* v. 240, no. 22, June 1, 1955, p. 2104-2106.

Preparation of germanium by electrolysis of fused alkaline germanates. Tables. 4 ref. (C23, Ge)

118-C. (German.) **Reduction of Zinc Oxide With Carbon Monoxide and Hydrogen.** J. Gerlach and O. Knacke. *Zeitschrift fur Erzbergbau und Metallhüttenwesen,* v. 8, no. 6, June 1955, p. 275-278.

Equilibrium diagram of muffle reaction; experimental determination of reaction rate of zinc oxide with carbon monoxide and hydrogen; function of gas concentration. Table, graphs, diagrams. 1 ref. (C21, Zn)

119-C. Refining at Fort Saskatchewan. Sydney Nashner. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 519, July 1955, p. 396-410, *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 212-226.

Pressure leaching-reduction process for nickel-copper concentrates. Flowsheet, diagrams, photographs, tables. 6 ref.
(C general, B14, Cu, Ni)

120-C. Variations and Modifications of Kroll Process for Production of Zirconium Metal. H. L. Gilbert and C. Q. Morrison. *Chemical Engineering Progress,* v. 51, July 1955, p. 320-325.
Development of ways to streamline production methods making the existing furnaces and facilities more effective without additional expenditure for primary equipment. Studies of reduction reactions, zirconium chloride purification and magnesium chloride removal. Photographs, graph, diagrams. 6 ref.
(C4, C26, Zr)

121-C. Out of a Vacuum—Tougher Metals. *Steel,* v. 137, July 25, 1955, p. 88-90.
Description and operation of 1000-lb. vacuum melting furnace. Process provides big boost for stress-rupture life. Photographs, graphs.
(C25, D8, Q4)

122-C. Preliminary Electric Smelting Research on Philippine Nickelferous Ores. L. H. Banning and W. E. Anable. *U. S. Bureau of Mines, Report of Investigations* 5129, May 1955, 13 p.
Feasibility studies on production of ferronickel using laterite ores and bagasse. Tables, photographs.
(C21, Fe-n, Ni)

123-C. Melting, Refining, and Granulation of Cobalt Powder. J. D. Marchant, L. H. Banning and W. F. Hergert. *U. S. Bureau of Mines, Report of Investigations* 5133, May 1955, 14 p.
Removal of phosphorus and sulfur from a cobalt-nickel concentrate. Production of granules suitable for stockpiling. Photographs, tables.
(C21, Co)

124-C. Thermodynamic Considerations in the Preparation of Beryllium Metal. H. H. Kellogg. Paper from "The Metal Beryllium", American Society for Metals, p. 49-62.
Thermodynamic data, sources of data, reduction by calcium metal, halide, thermal and electrolytic reduction, refining by distillation. Tables, graphs. 18 ref.
(C general, P12, Be)

125-C. The Fluoride Extraction of Beryllium From Beryl. Henry C. Kawecki. Paper from "The Metal Beryllium". American Society for Metals, p. 63-70.
Basic chemistry, commercial practice, product uses and production of beryllium fluoride. Diagram. 20 ref.
(C4, Be)

126-C. The Sulphate Extraction of Beryllium From Beryl. C. W. Schwenzfeier, Jr. Paper from "The Metal Beryllium". American Society for Metals, p. 71-101.
Production of beryllium hydroxides, oxides and fluorides; thermochemical reduction to beryllium metal; purification and consolidation of beryllium pebbles by vacuum melting and casting. Diagrams, photograpns, table. 6 ref.
(C general, Be)

127-C. The Production of Beryllium by the Electrolysis of Beryllium Chloride. C. E. Windecker. Paper from "The Metal Beryllium". American Society for Metals, p. 102-123.
Preparation of unrefined beryllium chloride and the subsequent purification by electrolysis. Diagrams, graphs, photograph. 7 ref.
(C23, Be)

128-C. Experimental Reductions of Beryllium. T. T. Magel. Paper from "The Metal Beryllium". American Society for Metals, p. 124-135.
Reduction of beryllium halides with alkali and alkaline earth metals; reduction of beryllium oxide; electrolytic reduction and other reduction experiments. Diagrams. 36 ref. (C general, Be)

129-C. (German.) **Amalgam as an Auxiliary Medium in Metallurgical Research.** Franz Lihl. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 434-441.
Low-temperature formation of alloys by the reduction and amalgam methods, preparation of binary, ternary and quaternary alloys by amalgamation process, limits of field of application. Graphs, phase diagrams. 21 ref. (C29)

130-C. (Polish.) **The Process of Zinc Rectification.** Aleksander Krupkowski and Henryk Fik. *Archiwum Gornictwa i Hutnictwa,* v. 2, no. 3, 1954, p. 243-352.
Balances necessary to estimate the elements of working intensity of the rectification furnace and, especially, for the evaporation chambers, first stage condensation chambers and condensors. Tables, graphs, diagrams. 17 ref. (C22, Zn)

131-C. (German.) **Mechanism of the Cyanidation Method in the Metallurgy of Gold.** E. Abel. *Monatshefte für Chemie,* v. 86, no. 3, 1955, p. 536-539.
A new interpretation of the mechanism based on autoxidation. 17 ref. (C24, Au)

132-C. Slag Fuming Furnaces Recover Zinc and Lead From Copper Slag. R. E. Mast and G. H. Kent. *Journal of Metals,* v. 7, Aug. 1955, p. 877-884.

Equipment and procedures for use with reverberatory furnace slag. Photographs, graphs, tables, diagram, flowsheet. (C general, A8, Cu, Zn, Pb)

133-C. (French.) **The Extraction and Refining of the Platinum Metals From Their Sulphide Ores.** A. R. Raper and F. S. Clements. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 447-456.

Recovery of precious metals from the concentrates of anodic slimes, resulting from the electrolytic refining of copper and nickel by complex chemical processes. Table, diagrams. 25 ref. (C23, Pt)

134-C. The Production of Ductile Electrolytic Chromium. H. T. Greenaway. *Commonwealth of Australia, Dept. of Supply, Research and Development Branch,* A.R.L./MET 6, Dec. 1954, 24 p. + 4 plates.

Production of electrolytic chrominum containing 0.01-0.02% oxygen and 0.002% nitrogen as its major impurities, and a hydrogen reduction technique for reducing these values to below the chemically detectable amounts; i.e., 0.005% and 0.001% respectively. Tables, graph, photograph, diagram, micrograph. 13 ref. (C23, Cr)

135-C. Titanium. I. W. J. Kroll. *Metal Industry,* v. 87, July 22, 1955, p. 63-66.

History, ores and refining of titanium. Diagram, photographs. 28 ref. (To be continued.) C general, B general, Ti)

136-C. Titanium. II. W. J. Kroll. *Metal Industry,* v. 87, July 29, 1955, p. 83-86.

Fluoride reduction, iodide dissociation process, fusion electrolysis and soluble anode processes. 25 ref. (To be continued.) (C4, C23, C26, Ti)

137-C. (French.) **Utilization of Vacuum in Metallurgy.** J. A. Stohr. *Vide,* v. 10, no. 57, May-June 1955, p. 64-70.

Methods, equipment, fields of application, advantages and disadvantages. Table, diagram, graphs, photographs. (C25, D8, Cu)

138-C. (Italian.) **Using the Spectrograph to Control an Industrial Production of Electrolytic Zinc and By-Products.** G. Scacciati and A. D'Este. *Metallurgia italiana,* v. 47, no. 6, June 1955, p. 259-265.

Advantages and limitations in applying the spectrograph to control silver, bismuth, indium, thallium, germanium, tin, antimony, molybdenum, arsenic and gallium in zinc and cadmium production. Tables. 14 ref. (C23, S11, Zn, Cd)

139-C. Ultra-Pure Solids for Electronics. Max M. Gransden. *Canadian Metals,* v. 18, Aug. 1955, p. 26, 28-29.

Utilization of semiconductors and metallurgical techniques in their refinement; zone refining. Graph, photographs. 4 ref. (C5, Ge, Si)

140-C. Refractories for the Copper Industry. *Ceramics,* v. 7, July 1955, p. 200-206.

Requirements for refining and smelting furnaces. Types used in the hearth, bottom and roof. Diagrams, photographs. 4 ref. (C21, B19, Cu)

141-C. Some Aspects of the Chemical Processes Ancillary to Atomic Energy. The Manufacture of Uranium Metal From Ore. Christopher Hinton. *Institution of Chemical Engineers, Transactions,* v. 33, no. 1, 1955, p. 45-51.

Processes involved in the manufacture of pure uranium for use in atomic piles. (C general, U)

142-C. Zone Refining of Titanium. *Light Metal Age,* v. 13, Aug. 1955, p. 19.

Process, called cage-zone refining, uses a unique method to melt a bar of metal while the metal acts as its own crucible, thus preventing contamination by any containing vessel. Object of the process is to prepare a super-pure metal. Photograph. (C5, Ti)

143-C. Behavior of Titanium Dioxide on Heating and Toward Ferric Oxide, Sodium Oxide, and Magnesia. E. Junker. *Henry Brutcher Translation No.* 3547, 14 p. (Abridged from *Zeitschrift für Anorganische und Allgemeine Chemie,* v. 228, no. 2, 1936, p. 97-111.) Henry Brutcher, Altadena, Calif.

Experiments conducted on titanium dioxide and mixtures of it with other oxides in order to obtain more information on titanium-containing slags. Graphs, diagrams. 31 ref. (C21, Ti)

144-C. Theory of the Electrolytic Production of Aluminum. I-II. E. Bonnier. *Henry Brutcher Translation Nos.* 3563-3564, 38 p. (From *Bulletin de la Société Chimique de France,* 1954, no. 1, p. 1D-11D) Henry Brutcher, Altadena, Calif.

Study of state of dissociation in the cryolite-bath electrolysis of alu-

mina; nature of the ions; existence of AlO_2 or AlO; dissociation in alkaline baths and acid baths. Measurements of polarization, decomposition and individual electrode potentials. 85 ref. (C23, Al)

145-C. Purification of Silicon. Henry C. Theuerer. *Bell Laboratories Record,* v. 33, Sept. 1955, p. 327-330.

Methods of preparing silicon for use in research and development purposes. Photographs, diagram. (C21, Si)

146-C. Methods of Separating Zirconium From Hafnium and Their Technological Implications. F. Hudswell and J. M. Hutcheon. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8P-/409, July 1955, 20 p.

Since hafnium occurs naturally with zirconium and since its presence produces undesirable properties, several processes were devised to obtain pure zirconium. Tables, photograph, diagrams, graphs, flowsheets. 13 ref. (C28, Hf, Zr)

147-C. Titanium. W. J. Kroll. *Metal Industry,* v. 87, Aug. 5, 1955, p. 105-108; Aug. 12, 1955, p. 130-134; Aug. 19, 1955, p. 147-149; Aug. 26, 1955, p. 173-174.

Magnesium reduction of titanium tetrachloride and treatment of the reduced sponge; ingot melting and casting; mechanical properties. Diagrams, photographs. 88 ref. (C26, C4, C5, Q general, Ti)

148-C. (French.) **Production of Germanium Alloys With Nickel, Iron, and Manganese by Fused Electrolysis.** Marie - Jeanne Barbier - Andrieux. *Comptes rendus,* v. 241, no. 3, July 18, 1955, p. 309-311.

Equipment and operating procedures. Tables. 8 ref. (C23, Ge)

149-C. Alumina. Kenneth M. Reese and W. H. Cundiff. *Industrial and Engineering Chemistry,* v. 47, Sept. 1955, pt. 1, p. 1672-1680.

History of aluminum research and production, present methods of obtaining aluminum from alumina. Tables, flowsheet, photographs, diagram. 6 ref. (C general, Al)

150-C. Metallurgy of Thorium. G. E. Kaplan. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/636, June 1955, 7 p. (Translated from the Russian.)

Monazite decomposition by acid and alkali methods and purification of thorium by electrolysis of fused salts with either liquid or solid cathode. Graphs. 4 ref. (C28, C23, Th)

151-C. The Preparation of Uranium Metal by the Reduction of Uranium Tetrafluoride With Magnesieum. H. A. Wilhelm. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/817, June 1955, 28 p.

In the reduction process, magnesium is preferred over calcium since commercial grade offers less contamination, amount required is reduced and cost is lower. Photographs, diagrams, graphs. (C26, U)

152-C. Production of High-Purity Metallic Bismuth. N. P. Sajin and P. Y. Dulkina. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/637, June 1955, 11 p. (Translated from the Russian.)

Investigation of hydrometallurgical and crystallophysical methods. Tables, diagrams. 8 ref. (C28, Bi)

153-C. Production of Uranium Metal. L. Grainger. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/407, June 1955, 6 p.

Possibilities of improving existing processes which would result in producing the metal from concentrates, comparing favorably with other metals in cost, design and purity. (C4, U)

154-C. Separation of Hafnium From Zirconium and Production of Pure Zirconium Dioxide. N. P. Sajin and E. A. Pepelyaeva. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/634, June 1955, 13 p. (Translated from the Russian.)

Outlines separation method by fractional crystallization of zirconium, hafnium and potassium bifluorides. Photographs, graphs, table. 9 ref. (C28, Zr, Hf)

155-C. Sound Uranium Ingots Cast Using Consumable Electrode Arc-Melting. F. R. Lorenz and W. J. Hurford. *Journal of Metals,* v. 7, Sept. 1955, p. 952-955.

Process for successfully producing ingots, by melting derby uranium, is clean and easy to control when remelting uranium previously vacuum-induction melted and cast. Photographs, diagrams. (C5, C21, U)

156-C. Temperature Gradient Zone Melting. W. G. Pfann. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 961-964.

Phenomenon is utilized in fabricating semiconductive devices, growing single crystals, joining, boring fine holes in solids, measuring diffusivities in liquids, small scale alloying and purification. Diagrams, photographs. 9 ref. (C5)

157-C. Slug Feeder for Dissolver. S. O. Lewis. Paper from "Fourth Annual Symposium on Hot Laboratories and Equipment". TID-5280. Office of Technical Services, U. S. Department of Commerce, p. 347-355.

Design and operating characteristics of a simple hopper, which operates under water, to charge the hydraulic powered feeder tube leading to dissolver. Photographs, diagrams. (C general, U)

158-C. (English.) **The Use of Scale Models for Investigating the Effect of Steel Parts on Magnetic Fields in Large Aluminium Furnaces.** Oluf C. Bockman. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 151-157.

Basic theory used, construction and operation of the models, representative measurements. Diagrams, photographs, graphs. (C21, Al)

159-C. (English.) **The Subhalide Distillation of Aluminium.** P. Gross. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 167-171; disc., p. 171.

Basic principles of evaporating aluminum as subhalide and of the production of pure aluminum by this method. Tables. 19 ref. (C4, Al)

160-C. (French.) **On a Theory of the Structure of Metallic Oxides of the M_2O_3 Type Dissolved in Fused Salts.** Georges Petit. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 45-49; disc., p. 49.

Results given by cryoscopic study of oxides of the M_2O_3 type, in cryolite and cryolite-sodium fluoride eutectic at high temperatures when applied to alumina, give a satisfactory theory of the electrolytic reduction of aluminum. Graphs. 13 ref. (C23, Al)

161-C. (French.) **Contribution to the Study of the Molecular Condition of Aluminum, Magnesium and Beryllium Oxides Dissolved in Fused Fluorides, by Cryoscopy in Pure Sodium Fluoride, in the Sodium Fluoride-Potassium Fluoride Eutectic and in Cryolite.** Maurice Rolin. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 51-61; disc., p. 61.

Results obtained in sodium fluoride—potassium fluoride eutectic, and a high solubility; and in pure sodium fluoride, and a low solubility. Graphs, tables. 24 ref. (C4, Al, Be, Mg)

162-C. (French.) **Preparation of a Calcium-Aluminum Alloy and Its Use as a Reducing Agent of Titanium Dioxide.** André Chrétien, William Freundlich, Michel Bichara and Gilbert Tourné. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 103-106.

By its oxidation with a preferred formation of $5CaO{\cdot}3Al_2O_3$ and liberation of aluminum, it can reduce the refractory oxides with direct formation of aluminum alloys with the metal of the used oxide. Radiograms, graphs, tables. (C26, Al)

163-C. (French.) **Preparation of Calcium From Calcium Carbide by Means of Aluminum.** Pierre Vignial. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 107-109.

Experiments carried out on samples at temperature from 1150 to 1250° C. under 10^{-3} mm. mercury. About 80% of the total calcium processed was extracted; recovered portion, in bulk, contains more than 96% metallic calcium. Tables. 12 ref. (C26, Al, Ca)

164-C. (French.) **The Development of Baths for the Electrolysis of Aluminum From Sainte-Claire DeVille to the Present Time.** Alfred von Zeerleder. Paper from "Congrés International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 115-121.

History of development of baths for the electrolytic production of aluminum. Diagrams, photographs, table. (C23, Al)

165-C. (French.) **Where Do We Stand in Our Knowledge of the Theory of the Electrolysis of Aluminum?** A. Vajna. Paper from "Congrés International de l'Aulminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 123-130; disc., p. 130.

Results in theoretical and experimental research regarding aluminum electrolysis which have been published in scientific literature during recent years in Europe and America. Graphs, photographs. 28 ref. (C23, Al)

166-C. (French.) **On the Electrochemical Series of Metals in Fused Alkali Fluorides.** Kai Grjotheim. Paper from "Congrés International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 131-136.

Experimental determination, at 850° C., of the relative position in

the electrochemical series of aluminum, manganese, chromium and nickel dissolved in the fused eutectic mixture of sodium and potassium fluorides. Photographs, tables, diagrams. 6 ref.
(C23, C4, Al, Cr, Mn, Ni)

167-C. (French.) **Thermodynamic and Experimental Contribution to Electrometallurgy of Aluminum.** Marc van Lancker. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 137-141; disc., p. 142.

Use of generalized thermodynamic interpretation of cryoscopic phenomena (liquidus and solidus equilibria) and introduction of some data from crystallographic stereochemistry, to get a clear idea of structural ionic characteristics of the electrolyte in the molten state. Micrograph, graph, X-ray diffractogram. 10 ref.
(C23, Al)

168-C. (French.) **Electrolysis of Aluminates.** Etienne Bonnier. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 159-165; disc. p. 165.

Methods of electrolyzing the aluminates which have been developed and the practical and theoretical results obtained. Tables. 7 ref.
(C23, Al)

169-C. (German.) **Investigation of the Crystal Structure of Pure Aluminum and Raffinal Pressure Cast Ingots.** Dietrich Altenpohl. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 535-544.

Advantages and disadvantages of pressure cast structure in comparison with the chill cast ingot; influence of cooling rate and segregation on the corrosion resistance and blow-hole formation. Tables, graphs, micrographs, photographs. 32 ref.
(C5, M26, Al)

170-C. (Italian.) **A New Method for Extracting Silver From Pb-Zn-Ag Alloys by the Parker Process.** E. Freni. *Metallurgia italiana,* v. 47, no. 7, July 1955, p. 315-321.

In this method, zinc is eliminated by fusion with sodium hydroxide; silver-rich lead anodes form silver slurry in sulfamic electrolyte. Further processing described. Tables, graphs, diagrams, phase diagram. 6 ref. (C23, C28, Ag)

171-C. (Italian.) **Zinc and Copper Cathodes Cast in Large Electric Furnaces.** J. Tostmann and G. Conti. *Metallurgia italiana,* v. 47, no. 7 July 1955, p. 322-330.

Contemporary types of furnaces for copper and zinc smelting. Graphs, diagrams, photographs.
(C21, Cu, Zn)

172-C. (Russian.) **Mineral Formation Processes During the Service Life of Dinas Brick in the Crown of an Electric Lead Smelting Furnace.** N. I. Kulaeva. *Ogneupory,* v. 20, no. 5, 1955, p. 228-233.

Chemical compositions and spectrochemical analysis in different zones of the brick after service; vitrification and loss in surface layer. Tables, photograph micrographs. 4 ref. (C21, Pb)

173-C. **The Influence of Vibration on the Solidification of an Aluminum Alloy.** R. S. Richards and W. Rostoker. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 23, 1955, 21 p.

Vibration imposed during solidification of an aluminum alloy produces grain refinement, pipe suppression, suppression of columnar grain growth and elimination of dendritic grain geometries. Diagrams, graphs, micrographs. 4 ref.
(C5, N12, Al)

174-C. **Gases in Copper, as Exemplified by Porosity in Deoxidised Billets.** Clement Blazey. *Australasian Engineer,* 1955, Aug., p. 71-75.

Causes discussed. Comments on failure of some holes to weld in hot working. Twelve varieties (seven cast in Australia and five in North America) of 3-in. billets considered. Table, micrographs. 12 ref.
(C5, Cu)

175-C. **How Mitsubishi's New Akita Plant Makes 99.997% Electrolytic Zinc.** Katsuji Nakanishi. *Mining World,* v. 17, Oct. 1955, p. 56-59, 70.

Operations at plant based on four kinds of concentrates. Photographs, tables, flowsheet. (C23, Zn, Cd)

176-C. (German.) **Investigation of Johnson Process for Aluminum Production.** H. Ginsberg and G. Wilde. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 9, Sept. 1955, p. 403-413.

Johnson method of aluminum production, its theoretical basis, laboratory experiments and pilot plant tests. Tables, micrographs, graphs, diagram. (C general, Al)

177-C. (Book-German.) **Electrolytic Precipitation and Electrocrystallization of Metals. Elektrolytische Abscheidung und Elektrokristallisation von Metallen.** Hellmuth Fischer. 717 p. 1954. Springer-Verlag, Berlin, Germany.

Electrochemistry, electrocrystalli-

zation, properties of cathode precipitation, and conditions for the precipitation of several metals and alloys. (C23)

178-C. Aluminum, Light Metals King. Kenneth M. Reese, A. F. Garcia and R. A. Lewis, *Industrial and Engineering Chemistry,* v. 47, Oct. 1955, p. 2066-2072.

Raw materials, equipment and operation of electrolytic aluminum refinery. Photographs, flowsheets tables. 7 ref. (C23, Al)

179-C. Zone Melting of Decomposing Solids. J. van den Boomgaard, F. A. Kröger and H. J. Vink. *Journal of Electronics,* v. 1, ser. 1, Sept. 1955, p. 212-217.

Method which makes it possible to apply the technique in systems which would otherwise decompose. Diagrams, graphs. 12 ref. (C5)

180-C. Continuous Casting. J. S. Smart, Jr. *Metal Progress,* v. 68, Oct. 1955, p. 117-125.

Comparisons of various processes for aluminum, magnesium, copper and steel. Photographs, diagrams, table. (C5, D9, Al, Cu, Mg, ST)

181-C. (German.) **Treatment of Melts for the Casting of Aluminum Ingots.** A. Roth. *Aluminium,* v. 31, no. 10, Oct. 1955, p. 484-489.

Avoiding gas uptake and oxide skin formation on molten metal, routine determination of gas content. Photographs, graph, diagrams. 23 ref. (C5, Al)

182-C. (German.) **Development of Induction-Heated High-Vacuum Smelting Plants.** Otto Winkler. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, nos. 7-8, July-Aug. 1955, p. 207-214.

Different stages of induction heated vacuum smelting apparatus; cost distribution of the plant components; perspective improvement problems. Diagrams, photographs. 4 ref. (C25, C21)

183-C. (German.) **Fundamentals and Limits of Vacuum Smelting Engineering.** Walter Deisinger. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, nos. 7-8, July-Aug. 1955, p. 214-219.

Factors influencing the vacuum capacity in smelting; ways for improvement. Table, photographs, graphs, diagrams. 10 ref. (C25, C21)

184-C. (German.) **High Vacuum Electric Arc Smelting of High Melting Metals.** F. Benesovsky, K. Sedlatschek and W. Wirth. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, nos. 7-8, July-Aug. 1955, p. 219-224.

Methods and apparatus for smelting tungsten, molybdenum, tantalum, columbium, titanium and zirconium. Diagrams, graphs, photographs, table. 13 ref. (C25, Mo, Nb, Ta, Ti, W, Zr)

185-C. On Zone Refining. Joseph L. Birman. *Journal of Applied Physics,* v. 26, Oct. 1955, p. 1195-1197.

Matrix method, used to solve difference equations which describe zone refining of a bar, designed for direct numerical calculation of the solute distribution, after any number of passes, with any initial solute distribution. Graph. 4 ref. (C5)

186-C. (French.) **Continuous Casting of Aluminum.** Erhard Herrmann. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 101-107.

Hunter-Douglas (mold composed of units making two endless chains), Properzi (tri-angular bar cast in V-groove in rotary copper wheel), and semicontinuous (fixed mold) processes. Photographs. 29 ref. (C5, Al)

187-C. (French.) **Earing in Deep-Drawing of Aluminum and Possible Remedies.** Raymond Chevigny. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 109-124; disc., p. 124-125.

Casting device which confers advantages of conventional continuous casting while yielding products which are not more prone to earing than those produced in ingot molds. Tables, micrographs, graph. 10 ref. (C5, G4, Al)

188-C. Preparation of Zirconium Metal. Kenneth Albert Walsh. *Ames Laboratory, Iowa State College (U. S. Atomic Energy Commission),* AECD 3640, July 1950, 57 p.

Preparation conducted in a sealed bomb by an exothermic chemical reduction capable of producing sufficient heat to fuse reaction products. Tables, diagrams. 18 ref. (C general, Zr)

189-C. (German.) **Investigation of the Johnson Method of Aluminum Production.** H. Ginsberg and G. Wilde. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 10, Oct. 1955, p. 478-485.

Summary and economic aspects of the entire process, with recommendations for making it feasible. Tables, diagrams, photographs. 20 ref. (C23, A4, Al)

SECTION D

FERROUS REDUCTION and REFINING

1-D. Hydrogen in Steeelmaking. H. Epstein, J. H. Walsh and T. B. King. *American Iron and Steel Institute, Preprint,* 1954, 23 p.

Measures for limiting hydrogen content include vigorous boil, prompt tapping, good ladle, runner and mold practice and low moisture in addition materials. Graphs, tables, diagrams. 15 ref. (D general, ST)

2-D. French Patent Solves Fume Problem in Oxygen Steelmaking. Pierre J. Leroy and L. Septier. *Journal of Metals,* v. 6, Nov. 1954, p. 1189-1191.

Equipment, operating procedure and dust characteristics. Photograph, tables, micrographs. 3 ref. (D3, ST)

3-D. (German.) **The Performance of Silica Brick in the Openhearth Roof.** Kamillo Konopicky. *Stahl und Eisen,* v. 74, no. 22, Oct. 21, 1954, p. 1402-1413.

Refractoriness under load, effects of pore volume and fluxes and permeability and durability. Tables, graphs. 26 ref. (D2)

4-D. (Hungarian.) **Technology of Acid Steel Production.** Andras Toth. *Ontöde,* v. 5, no. 6, June 1954, p. 130-137.

Hungarian experiments using electrical furnaces. Tables, diagrams. (D6, ST)

5-D. Developments in Steel Plant Refractories. L. A. McGill and J. A. Pierce. *American Ceramic Society Bulletin,* v. 33, Nov. 1954, p. 328-331.

Developments in acid, basic and super-duty refractories. Diagram, graphs. (D general)

6-D. A Statistical Investigation Into Factors Affecting the Life of Ladle Linings. J. E. Andrew. *British Ceramic Society, Transactions,* v. 53, Oct. 1954, p. 609-620.

Effects of slag depth, steel composition, teeming time and other variables. Graphs, tables. (D9, ST)

7-D. Steel-Ladle Trials on Fireclay Bricks. H. R. Lahr. *British Ceramic Society, Transactions,* v. 53, Oct. 1954, p. 621-634.

"Split-ladle" tests whereby two or more makes of bricks are built into the same ladle. Photographs, graphs, tables. (D9, ST)

8-D. Performance of Continental Ladle and Runner Bricks. G. Van Gijn. *British Ceramic Society, Transactions,* v. 53, Oct. 1954, p. 635-653.

Examination of the brick before and after use. Tables, diagrams, micrographs, graphs. 5 ref. (D9, ST)

9-D. A Laboratory Test for the Assessment of Ladle Bricks. J. Mackenzie. *British Ceramic Society, Transactions,* v. 53, Oct. 1954, p. 654-665; disc., p. 665-672.

Samples immersed in molten steel with a basic slag on top. Tables, photographs. (D9, ST)

10-D. The Use of Gaseous Oxygen in Open Hearth and Converter Steelmaking. D. J. O. Brandt. *British Steelmaker,* v. 20, Nov. 1954, p. 428-434.

Economics, technical advantages and techniques in current use. Diagrams, graphs, photographs. (D2, D3, CN)

11-D. Modern Steel Plant Teams Continuous Casting With Planetary Mill. E. C. Beaudet. *Iron Age,* v. 174, Nov. 4, 1954, p. 113-120.

Advanced equipment for production of stainless steel billets with high percentage of yield from molten to semifinished steel. Photographs, diagrams. (D9, SS)

12-D. Non-Metallic Inclusions. II. Deoxidation Products and Sulphides. H. B. Bell. *Iron & Steel,* v. 27, Nov. 1954, p. 531-537.

Reactions and effects of various combinations of manganese, silicon.

aluminum, zirconium, titanium and calcium. 69 ref. (D general, ST)

13-D. Effect of Secondary Checkers on Open Hearth Furnaces. H. S. Hall. *Iron and Steel Engineer,* v. 31, Nov. 1954, p. 112-122; disc., p. 122-126.

Secondary checkers increase production and reduce fuel requirements. Design and installation details. Graphs, diagrams, photographs. (D2)

14-D. The Problem of Rupture of the Billet in the Continuous Casting of Steel. J. Savage and W. H. Pritchard. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 269-277.

Measurements of friction between billet and mold and of heat transfer through the mold wall. Method for preventing rupture. Diagrams, graphs. 15 ref. (D9, ST)

15-D. Chromium-Oxygen Equilibrium in Liquid Iron. E. T. Turkdogan. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 278-283.

Influence of chromium-oxygen interaction on deoxidation. Decarburization of iron-chromium-carbon melts. Table, graphs. 17 ref. (D general, P12, Fe)

16-D. Oxygen Converter Bids as Steel Industry's Bright New Tool for Lower Cost Production. J. W. Irvin. *Western Metals,* v. 12, Nov. 1954, p. 43-45.

Experience of Kaiser engineers on production of high-quality, low-carbon steel. Photographs, diagram, graphs. (D3, CN)

17-D. (French.) **Decarburization in the Open-Hearth Furnace.** Pierre Vallet. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 709-722.

Theoretical treatment. Tables, graphs, diagrams. 12 ref. (D2, ST)

18-D. (German.) **The New Large Blast Furnace of the Westfalenhütte Dortmund AG.** Wilhelm Wolf, Franz Heppner, W. Güldner and Paul Wolf. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1456-1464.

Comparison of American and German designs. Construction details and controls. Diagrams, photographs. (D1)

19-D. (German.) **Smelting of Mixed Ore-Coal Briquettes in the Low-Shaft Furnace.** Erich E. Hofmann. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1464-1468.

Comparison with standard blast furnace practice, preparation of burden and operational experience. Diagrams, graphs. (D1, CI)

20-D. (German.) **Blowing of Open Hearth Pig Iron With Oxygen Enriched Air in the Bottom Blown Converter.** Hans Kosmider, Herbert Neuhaus and Arthur Weyel. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1473-1485.

Blowability, dephosphorization, manganese slagging, nitrogen movement, heat requirements and castability of the steel. Graphs, table. 12 ref. (D3, CN)

21-D. (German.) **Blowability of Mixtures of Basic Bessemer and Open-Hearth Pig Iron in the Basic Converter.** Erwin Eickworth and Theo Kootz. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1486-1492.

Dephosphorization, nitrogen adsorption, manganese losses and heat requirements. Graphs, tables. 10 ref. (D3, CN)

22-D. (German.) **Experiments to Melt Pure Iron in High Vacuum.** Franz Wever, Wilhelm Anton Fischer and Helmut Engelbrecht. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1515-1521.

Theoretical considerations of deoxidation by hydrogen and carbon under various conditions. Graph, diagrams, tables. 16 ref. (D8, Fe)

23-D. (German.) **Development of the Oxygen-Blowing Process of Producing Low-Nitrogen Steel.** Arno Ristow. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 30, Oct. 21, 1954, p. 1004-1005.

New Austrian process and experiences with this method of producing high-quality steel. (D3, CN)

24-D. (Hungarian.) **Steel Manufacture in the Induction Furnace.** Endre Lendvai. *Ontöde,* v. 5, no. 10, Oct. 1954, p. 228-234.

Theory and practical application of resistance, electric arc and induction furnaces. Diagrams. (To be continued.) (D6, ST)

25-D. Continuous Casting of Alloy Steel Billets. T. H. Adair. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 511, Nov. 1954, p. 740-747; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 478-485.

Review of machines and techniques developed since 1842 and details of Rossi-Junghans machine at Atlas Steels, Ltd. Diagrams, photographs, flow charts. (D9, AY)

26-D. Non-Metallic Inclusions. III. Nitrides and Exogenous Types. H. B. Bell. *Iron & Steel,* v. 27, Dec. 1954, p. 559-565.

Amounts, structures and effects

of nitrides, oxidation during pouring, slag and refractory entrapment; inclusions and effects of alloying elements in cast iron; identification of inclusions. 83 ref. (D9, M28, ST, CI)

27-D. Fuel Technology in the Iron and Steel Industry. L. H. W. Savage. *Metal Treatment and Drop Forging,* v. 21, Nov. 1954, p. 495-498, 502.

Heat requirements and losses, flame control, radiation research and temperature distribution in blast furnace foundations. (D1, B18)

28-D. Development of Continuous Casting of Steel. M. P. Newby. *Metal Treatment and Drop Forging,* v. 21, Nov. 1954, p. 506-508.

Research by the British Iron and Steel Research Association. Photographs. (D9, ST)

29-D. On the Combustion Zones in Front of the Blast Furnace Tuyeres. W. Kuczewski and K. Moszoro. *Henry Brutcher, Altadena, Calif., Translation no.* 3396, 22 p. (Abridged from *Hutnik,* v. 20, no. 12, 1953, p. 361-367.)

Previously abstracted from original. See item 72-D, 1954. (D1)

30-D. Melting of the Iron-Chromium-Aluminum Alloy 'Fekhral'. L. V. Marmorshtein. *Henry Brutcher, Altadena, Calif., Translation* no. 3180, 25 p. (From "Iron-Chromium-Aluminum Alloys", 1950, Mashgiz, Moscow, p. 28-46.)

Commercial production of 'Fekhral' alloys having the following composition range: 0.15% C, max., 0.30-1.00% Mn, 0.2-1.0% Si, 12-15% Cr, and 3.5-5.5% Al. Photographs, micrographs. 4 ref. (D general, SS)

31-D. (French.) **Half Siliceous, Half Basic Roofs.** Donney. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 11, 1954, p. 2081-2086.

Compares results of runs of open-hearth furnaces with basic roofs or siliceous roofs with those with half basic—half siliceous roofs. Economic advantages. Diagrams. (D2, ST)

32-D. (French.) **Slag Inclusions in Ingots.** Cloppet. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 11, 1954, p. 2111-2118.

Factors influencing formation of inclusions at the surface of various special steel ingots during casting. Tables. (D9, ST)

33-D. (French.) **Testing the Use of Fused Pure Silica in an Electric Furnace.** Achard. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 11, 1954, p. 2119-2124.

Tests of a silica brick furnace lining. Diagrams, tables. (D5, ST)

34-D. (French.) **Production of Semi-Hard Carbon Steels.** Royer. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 11, 1954, p. 2125-2134.

Use of electric steelmaking furnace. Analysis of slags just before tapping (after killing), in the ladle immediately after pouring from the furnace, and in the ladle at the end of casting. Tables, graphs. 5 ref. (D5, D9, CN)

35-D. Statistical Research Into Productivity Increases at Electric Steel Foundries. W. Trommer. *Henry Brutcher, Altadena, Calif., Translation no.* 2939, 9 p. (Condensed from *Giesserei,* v. 38, no. 18, 1951, p. 422-426.)

Previously abstracted from original. See item 378-D, 1951. (D5, ST)

36-D. Promises and Problems Posed by Vacuum Melting. James H. Moore. *Journal of Metals,* v. 6, Dec. 1954, p. 1368-1369.

Vacuum melting greatly improves mechanical properties of ferritic stainless steels. Operational problems. Photograph, graphs. (D8, Q general, SS)

37-D. Bright Future Predicted for Vacuum Melted Metals in Chemical Industry. E. M. Mahla. *Journal of Metals,* v. 6, Dec. 1954, p. 1370-1371.

Vacuum melted steels show improved mechanical and corrosion properties. Photograph, micrographs. 1 ref. (D8, Q general, R general, AY, SS)

38-D. Carbon and Graphite Electrodes Evaluated for Use in Ferroalloy Furnaces. R. S. Hogue, R. L. Westlake and G. M. Moga. *Journal of Metals,* v. 6, Dec. 1954, p. 1379-1382.

Factors influencing design and selection of electrodes. Photographs, tables, graphs. (D8, Fe-n)

39-D. Inclusions in Steel From Pouring Refractories. D. J. Carney and E. C. Rudolphy. *Journal of Metals,* v. 6, Dec. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954, p. 1391-1395.

Nozzles and wells found to be greatest contributors. Recommendations for minimizing inclusions. Tables, micrographs, photographs. 5 ref. (D9, ST)

40-D. Analysis of Factors That Limit the Production Rate and Coke

Rate in the Iron Blast Furnace. W. O. Philbrook. *Journal of Metals,* v. 6, Dec. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954, p. 1396-1406.

Interrelations among pressure drop, gas flow and charge characteristics. Factors limiting ore size. Table, graphs. 20 ref. (D1, CI)

41-D. (Dutch.) **Induction and Electric-Arc Furnaces.** *Bedrijf en Techniek,* v. 9, no. 213, Oct. 23, 1954, p. 491-493, 502.

Characteristics and uses in the metals industry. Photographs. (D6, D5, C21)

42-D. (French.) **Determination of the End of the Basic Bessemer Reaction. Measurement and Recording of the True Temperaure of the Converter Flame.** J. Galey, P. Leroy and M. Denis. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 795-809.

Opacity of flame as function of time determines end of blow. Instrumentation. Tables, graphs, diagrams, micrographs. 7 ref. (D3, S16, CN)

43-D. (German.) **Model Experiments on the Low-Temperature Smelting Process.** Helmut Maetz and Hans-Jürgen Engell. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 397-404.

Experiments on reduction of iron ore with ore-coal briquets and cobalt, designed primarily to find economical use of low-quality coal for this purpose. Diagram, table, graphs. 12 ref. (D8, Fe)

44-D. (German.) **Current Development of Oil-Fired Open-Hearth Furnaces in Austria.** Fritz Hönig-Hönigsberg. *Stahl und Eisen,* v. 74, no. 24, Nov. 18, 1954, p. 1583-1591.

Designs, heat economy, refractories, performance, conversion from gas firing. Tables, diagrams, photographs. 10 ref. (D2, ST)

45-D. (German.) **The Oxygen Low-Shaft Furnace and Its Mode of Operation.** Hans Erne. *Stahl und Eisen.* v. 74, no. 25, Dec. 2, 1954, p. 1644-1648.

Influence of variations in charged materials, type of fuel and oxygen content of blast on operating characteristics. Diagrams, graphs, tables. 7 ref. (D1, CI)

46-D. (German.) **Investigations on the Movement of Nitrogen During the Combustion of Carbon.** Karl Georg Speith and Helmut Bücken. *Stahl und Eisen,* v. 74, no. 25, Dec. 2, 1954, p. 1648-1650.

Reduction of nitrogen absorption by prolonging the basic bessemer blow. Removal of nitrogen by top blowing with pure oxygen. Graphs. (D3, CN)

47-D. (German.) **Investigations on the Effect of Limestone Additions on Nitrogen Absorption During Air Refining.** Karl Georg Speith and Helmut Bücken. *Stahl und Eisen,* v. 74, no. 25, Dec. 2, 1954, p. 1650-1652.

Equilibria in converter gases, refining action and additional gas evolution due to limestone additions. Graphs. 4 ref. (D3, CN)

48-D. (Italian.) **Oxygen in Metallurgy.** G. Husson. *Metallurgia italiana,* v. 46, no. 9, Sept. 1954, p. 297-311; disc., p. 310.

Uses and developments in various steelmaking furnaces since 1940. Micrograph, photographs, table, graphs. 37 ref. (D general, ST)

49-D. Correlating Blast Furnace Operating Concepts. V-VI. Charles E. Agnew. *Steel,* v. 135, Dec. 20, 1954, p. 84, 86, 88; Dec. 27, 1954, p. 68-71.

Volatile-free magnetite reduces heat requirements; changes in practice caused by present ore supplies. (D1, CI)

50-D. (Czech.) **Effects of Residual Elements and Gases on Steel Product Quality.** Miroslav Sicha. *Hutnické Listy,* v. 9, no. 7 July 1954, p. 386-397.

Causes and sources of inclusions and residual components. Effects on mechanical properties. Diagrams, photographs, tables, micrographs. 23 ref. (D general, Q general, ST)

51-D. (German.) **Experiences and Improvements in the Casting of Foundry Pig Iron on the Pig-Casting Machine of the VEB Eisenwerke West in Calbe (Saale).** Hans-Joachim Lux. *Metallurgie und Giessereitechnik,* v. 4, no. 10, Oct. 1954, p. 446-449.

Includes photographs. (D9, Fe)

52-D. Convection and the Heating of Scrap. L. F. Daws and R. D. Collins. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 349-353.

Penetration of charge by open-hearth combustion gases reduces heating times by significant amounts. Graphs. 3 ref. (D2, ST)

53-D. The Sulphur Distribution Reaction Between Blast-Furnace Slag and Metal. J. Taylor and J. J. Stobo. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 360-367.

Experimental data show that equilibrium can be reached while the oxygen potential is higher than

that corresponding to C-CO. A reaction mechanism is suggested. Reaction between coke and the FeO (MnO) of the slag is limiting factor on distribution ratios. Diagram, graphs, tables. 15 ref. (D1, CI)

54-D. Use of Cold Coke-Oven Gas and Pitch-Creosote Firing on Tilting Furnaces. Development at Appleby-Frodingham. W. Jackson. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 378-390.

Effects of change in firing practice on fuel and refractory consumption, output rates, sulfur burden and oxidation rates in two furnaces. Diagrams, tables. 3 ref. (D2)

55-D. High-Temperature Water Cooling of O.H. Furnaces by Steam-Producing Elements. F. J. Feltoe and P. M. Moreton. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 391-395.

Developments in the German steel industry. Cost advantages. Diagrams, graph, table. (D2)

56-D. Soviets Pour Cast Iron Sheet Material in New Process. F. H. Baer. *Western Machinery and Steel World,* v. 45, Dec. 1954, p. 84-86.

Method of continuous casting between water-cooled rollers. Diagrams. (D9, CI)

57-D. (Czech.) **Coreless Low-Frequency Induction Furnace for Steel Production.** Emil Langer. *Slévarenstvi,* v. 2, no. 8, *Prace Ceskoslovenského Vyzkumu Slévarenského,* v. 1, no. 10, Aug. 1954, p. 65-70.

Advantages and limitations of 50-cycle heating; comparisons with 1000-cycle operation. Diagrams, tables, graph. 4 ref. (D6, CI)

58-D. (Russian.) **Reduction of Ferric Oxides by Graphite.** V. I. Arkharov, V. N. Bogoslavskii, M. G. Zhuravleva and G. I. Chufarov. *Doklady Akademii Nauk SSSR,* v. 98, no. 5, Oct. 11, 1954, p. 803-806.

Reduction at temperatures from 1000 to 1150° C. in vacuum; mechanism of the crystallochemical transformations. Graph, table. 7 ref. (D8, Fe, C)

59-D. A Survey of the Results of the Examination of the Brickwork of Blown-Out Blast-Furnaces. H. M. Richardson and G. R. Rigby. *Iron and Steel Institute Special Report no.* 51, Oct. 1954, 35 p.

Data for 79 furnaces at 30 plants examined during the last 20 yr. (D1)

60-D. Pig Iron Made From Low-Grade Fine Ore and Noncoking Coal. *Metal Progress,* v. 67, Jan. 1955, p. 81-86.

Construction and operating experience of semicommercial low-shaft blast furnace. Diagrams, photographs. (D1, Fe)

61-D. French Steelmaking Progress in 1954. G. Husson. *Metal Progress,* v. 67, Jan. 1955, p. 127-128, 202, 204.

Optical pyrometers are being attached to converters, and the blast (air plus oxygen and steam) regulated so melt is cool until just before the end of the blow. Open-hearth research in France is centered on gas movements, combustion and control of sulphur from high-sulphur fuel oil. (D3, D2, ST)

62-D. (German.) **Correlation Between Furnace Design and Wear of the Refractory Lining in the Blast Furnace.** Heinrich Kahlhöfer and Alfred Send. *Stahl und Eisen,* v. 74, no. 26, Dec. 16, 1954, p. 1697-1713.

Review of developments, prevention of salamander formation, use of carbon brick. Diagrams, photographs, graphs. 32 ref. (D1)

63-D. (Hungarian.) **Economical Utilization of Steel Scrap Containing Chromium by Oxygen Blast.** Erno Weigl. *Kohaszati Lapok,* v. 9, no. 11, Nov. 1954, p. 490-492.

Hungarian investigations on three experimental charges with varying oxygen concentrations in the blast. Graphs. (D3, ST)

64-D. Electrostatic Precipitation of Open Hearth Furnace Dust. J. H. Smith. *Blast Furnace and Steel Plant,* v. 43, Jan. 1955, p. 58-59.

Experience with gases from large hot-metal charged furnaces. Photographs. (D2, A6)

65-D. Development in German Blast Furnace Design and Practice. David Knall. *Blast Furnace and Steel Plant,* v. 43, Jan. 1955, p. 83-84, 96, 98.

Contrast of old and new designs on recently installed equipment. Diagrams, table. (D1)

66-D. Sulphur Removal Studies in Basic Electric Furnace Melting. Edward A. Loria. *Blast Furnace and Steel Plant,* v. 43, Jan. 1955, p. 86-87, 114-115.

Slag compositions and properties for best performance. Graphs, table. 7 ref. (D5, ST)

67-D. Hot Blast Cupola. R. Sewell. *Iron & Steel,* v. 28, Jan. 1955, p. 31-32.

Economics of a premelting unit in an openhearth shop. Tables, graph. 4 ref. (D2, ST)

68-D. Hydro-Arc Control Reduces Costs in Electric Furnace Operation. Joseph Seymour. *Journal of Metals,* v. 7, Jan. 1955, p. 17-18.

Controls, used with otherwise standard equipment, save power, refractories and time. Photographs, table. 1 ref. (D5)

69-D. Some Factors Affecting Open-Hearth Performance. D. J. Carney, J. J. Oravec and E. Van Meter. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 39-50.

Factors influencing combustion-air temperatures and effects on operation of regenerative systems. Diagrams, photograph, tables, graphs. 2 ref. (D2)

70-D. Low Temperature Reduction of Iron Oxides. A. D. Franklin and R. B. Campbell. *Journal of Physical Chemistry,* v. 59, Jan. 1955, p. 65-67.

Reactions in the vicinity of 200° C. Tables, graph. 19 ref. (D general, Fe)

71-D. (Hungarian.) **The Influence of Method of Obtaining and Preparing Specimens on High-Quality Steel Making.** Laszlo Stehlik. *Kohaszati Lapok,* v. 9, no. 6, June 1954, p. 247-252.

Sources of error in obtaining and processing test specimens. Practical eaxmples. Tables, photographs. (D general, S12, CN)

72-D. (Hungarian.) **Some Problems of Modern Steel Production.** Ernö Weigl. *Kohaszati Lapok,* v. 9, no. 8, Aug. 1954, p. 346-348.

Importance and effect of manganese; rate of carbon reduction; desulfurization; production of refractory brick. Graphs. (D general, ST, Mn)

73-D. The Basic Open Hearth Process. III. G. Reginald Bashforth. *British Steelmaker,* v. 21, Jan. 1955, p. 10-17.

Melt and slag control in hot and cold metal operation; features of modern basic practice. Graph, tables, photograph. 20 ref. (D2)

74-D. (English.) **Desulphurization of Molten Pig Iron With Pulverized Lime.** Bo Kalling. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 913-920.

Process does not melt the lime but results in rapid and effective removal of sulfur. Diagrams, tables, graphs. (D1, CI)

75-D. (Czech.) **Diffusion Deoxidation With Coke in the Open-Hearth Furnace.** Alex Dekanovsky. *Hutnické Listy,* v. 9, no. 12, Dec. 1954, p. 727-731.

Results of studies on various deoxidation practices. Tables. 1 ref. (D2, CN)

76-D. (German.) **Slagging of Titanium From Steel Melts in the Acid and Basic High-Frequency Furnace Under Different Slags.** Peter Bardenheuer and Wilhelm Anton Fischer. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 515-521.

Behavior of titanium-containing steel melts; reduction of silica by titanium; recommends lime-corundum slag for melting titanium steels. Graphs, table, refractograms, micrographs. 10 ref. (D6, AY)

77-D. Some Factors Affecting Open Hearth Performance. Dennis J. Carney, Joseph J. Oravec and Elgin Van Meter. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 12-41.

Extensive study on combustion air temperature thermal gradients in regenerative systems; effects of furnace design and age on air temperature and heat recovery; effects of operating variables. Diagrams, photograph, tables, graphs. 2 ref. (D2, ST)

78-D. A Statistical Approach to Melt-In Control. Stanleigh F. Elam and Franklin E. Williams. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 42-53.

Procedure for development and application of a simplified method for controlling feed ore and repig requirements. Graphs, tables. (D2, ST)

79-D. Tapping Heats Through a Bifurcated Spout Into Two Ladles. E. Courtney Sorrells. **Bifurcated Spout at Weirton.** Charles N. Straney. **Tapping Doubles Heats at Sparrows Point.** J. H. Kelley. **Bifurcated Spouts.** H. H. Northrup. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 63-69.

Operating difficulties encountered and solved in pouring double heats. Tables. (D9, ST)

80-D. Cleaning of Open Hearth Waste Gases at Fairless Works. Howard A. Parker. **Cleaning of Open Hearth Waste Gases by Kaiser Steel Corporation, California.** B. N. Dagan. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954. p. 69-78.

Construction and operation of electrostatic precipitators at two large steel plants. Photographs, table, graph. (D2, A5)

81-D. Rammed Acid Open Hearth Bottoms. H. C. Bigge. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 91-97; disc., p. 97-98.

Importance of good workmanship and proper characteristics of materials in preparing good furnace lining. Diagrams, photographs, tables. (D2)

82-D. Maintenance and Care of Open Hearth Furnace Bottom. J. S. Zahn. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 98-104; disc., p. 104-107.

Composition of sand and drying of rammed materials were found to be most important factors in obtaining good bottom life. Diagrams, photograph. (D2)

83-D. Influence of Pouring Practice on Axial Soundness of Large Ingots. S. A. Ott. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 107-108; disc., 108-110.

Factors in ingot practice for evaluating large ingots before any machining, forging or other treatment is started. Table. **(D9, ST)**

84-D. Boils and Furnace Bottoms. G. R. Fitterer. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37 1954, p. 111-118; disc., p. 118-122.

Effects of slag from previous heat and condition or state of furnace bottom on oxygen content of bath. Graphs, table. 8 ref. (D2, ST)

85-D. Hot Repair Versus New Roof Installation. Paul W. Nutting, **Hot Repair or a New Roof.** E. R. Eaton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 123-127; disc., p. 127-128.

Higher production gained by installing complete knuckle-to-knuckle roof instead of patching in many cases; examples of repair practice. Table. (D2)

86-D. Deformation Under Load at 2000° to 2500° F. and Silicate Liquid Absorption in Basic Brick. T. F. Berry, J. C. Ekedahl and R. B. Snow. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 128-145; disc., p. 145-146.

Comparison of various compositions of fired and chemically bonded brick. Tables, photographs, graphs. **6 ref. (D2)**

87-D. Testing Open Hearth Refractories. G. R. Eusner and W. S. Debenham. **Control Testing of Open Hearth Pit Refractories.** Charles N. Jewart. **Control Testing of Open Hearth Refractories.** W. J. Scharfenaker. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 146-154; disc., p. 154-155.

Factors in choice of refractory; characteristics to be tested; need of close cooperation with manufacturer. Graph, table. (D2)

88-D. Improvements in Checker Cleaning During Operation. W. H. Friesell. **Checker Cleaning.** E. F. Franzen. **Open Hearth Checker Maintenance During Operation.** Robert M. Jordan. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 156-171; disc., p. 171-172.

Advantages and practices of good cleaning systems. Photographs, diagrams, tables. (D2)

89-D. Double-Pass Versus Single-Pass Checkers. F. G. Jaicks. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 172-179.

Experience on an experimental furnace in developing a satisfactory operating practice. Graph, diagrams, tables. 2 ref. (D2)

90-D. Importance of Manganese in Steelmaking. F. W. Luerssen and P. H. Smith. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 180-186; disc., p. 186.

Effects of manganese on deoxidation, hot workability and mechanical properties. (D2, Q general, ST)

91-D. Oxidation of Phosphorus and Manganese During and After Flushing in the Basic Open Hearth. John F. Elliott and Frank W. Luerssen. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 193-208; disc., p. 208-211.

Distribution between metal and slag; effects of furnace characteristics. Graphs, tables. **11 ref.** (D2, ST)

92-D. Behavior of Manganese in the Basic Open Hearth. D. W. Murphy and R. S. Miltenberger. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 212-221; disc., p. 221-222.

Distribution between metal and slag for various bath compositions. Tables, graphs. 7 ref. (D2 ST)

93-D. Manganese and Formation of Inclusions. D. C. Hilty. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 222-229; disc., p. 229-233.

Changes in furnace practice to alleviate undesirable structures. Graphs, micrographs, 6 ref. (D2, ST)

94-D. Recent Developments in European Steelmaking Practice. H. B. Emerick. **American Adaptations of the Austrian Oxygen Converter Process.** W. C. Rueckel and W. A. Vogt. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 235-247; disc., p. 247-251.

Use of oxygen in blast furnaces and steelmaking operations. Graphs, tables. 8 ref. (D2, ST)

95-D. Laboratory Studies of Pouring Conditions as Revealed by High-Speed Motion Pictures. H. T. Clark. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 252-254; disc., p. 254-255.

Use of specially shaped stools and partial molds to study splashing of molten steel. Photographs. (D9, ST)

96-D. Effect of Rare Earth Additions on Surface Quality of Low-Carbon Steel. J. V. Russell. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 255-263.

Rare earth metal additions reduce sulfur content but cause hot brittleness. Rare earth oxide additions improve surface quality and reduce hot brittleness of aluminum killed steels. Table, photographs, graphs. 8 ref. (D2, CN, EG-g)

97-D. Stocking and Charging. E. E. McGinley. *American Institute of Mining and Metallurgical Engineers. Open Hearth Proceedings,* v. 37, 1954. p. 265-273.

Practice for close control of steel quality. Photograph, graphs. (D2)

98-D. Recent Uses of Open Hearth Automation. R. A. Lambert. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 274-283; disc., p. 283-284.

Benefits of automatic control of temperature and combustion processes. Photographs, charts. (D2)

99-D. Control of Melt Carbon and Working Heat. A. M. Kroner. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 284-286; disc., p. 286-288.

Control of charging and operating variables. (D2)

100-D. Elimination and Control of Air Infiltration. H. M. Parker. **Waste-Gas Analyses for Combustion Control.** Christian G. Rosenbohm. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 295-300; disc., p. 296-297, 300-301.

Advantages of close control of combustion processes. Table. (D2)

101-D. Quality Control With Low Iron Charges. H. W. Potter. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 301-305; disc., p. 305-309.

Control of residual elements arising from mixed scrap. Graph, photograph, diagram. (D2, CN)

102-D. Charging and Fluxing Practices in Cold-Metal Shops Using Burnt Lime and Low Percentage of Pig Iron. S. L. Fredericks. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 310-313; disc., p. 313.

Summary of practices in 19 open-hearth shops. Tables. (D2, ST)

103-D. Furnace Design for One Hundred Per Cent Natural Gas Firing. James L. Jennings and John R. Patton. *American Institute of Mining and Metallurgical Engineers, Open Hearth Proceedings,* v. 37, 1954, p. 320-327.

Changes in design required to make gas a satisfactory fuel. Diagrams, photographs. (D2)

104-D. European Ironmaking Practices. J. M. Walsh, Jr. *American Iron and Steel Institute, Preprint,* 1954, 27 p.

Ore treating and blast furnace practices. Diagrams, tables. (D1, B general CI)

105-D. Sulphur Distribution Between Flame and Slag in the Open Hearth Furnace. George St. Pierre. *American Iron and Steel Institute, Preprint,* 1954, 8 p.

Laboratory study shows increased slag basicity and higher temperatures increase transfer of sulfur to slag; oxygen content of flame influences sulfur transfer. Table, graphs. 7 ref. (D2, ST)

106-D. Multi-Purpose Grease Simplifies Furnace Equipment Lubrication. H. B. Jenkins. *Iron Age,* v. 175, Feb. 10, 1955, p. 104-105.

Lithium-base grease reduces blast furnace maintenance. Photographs, table. (D1)

107-D. Basic Open-Hearth Practice at Volta Redonda. L. Cook. *Iron and Steel Institute, Journal,* v.179, Jan. 1955, p. 1-17 + 1 plate.

Raw materials, furnaces, firing practice and expansion plans. Diagrams, tables, graphs, photographs. (D2, ST)

108-D. Use of a Thermal Model to Determine Temperature Under Blast-Furnace Hearths. E. J. Williams and E. J. Burton. *Iron and Steel Institute, Journal,* v. 179, Jan. 1955, p. 17-22.

Temperature contours from model agree with measurements on production furnace. Graphs, diagrams, photographs. 13 ref. (D1)

109-D. The Mechanism of the Reduction of Iron Oxides by Solid Coke. B. G. Baldwin. *Iron and Steel Institute, Journal,* v. 179, Jan. 1955, p. 30-36.

Reduction is almost entirely by gaseous reactions involving carbon monoxide and dioxide. Application of data to blast furnace process. Diagram, graphs. 20 ref. (D1, CI)

110-D. Some Starting and Operating Experiences at Abbey Melting Shop. A. J. Kesterton. *Iron and Steel Institute, Journal,* v. 179, Jan. 1955, p. 46-57.

Equipment and operating schedules for mixer bay, 200-ton furnace, scrap and raw material handling; ingot practice and use of oxygen for decarbonizing. Tables. (D2, ST)

111-D. The Application of the Manganese and Phosphorus Equilibria to the Production of High-Quality Cast Steel. F. Eisermann. *Sulzer Technical Review,* 1954, no. 2, p. 33-36.

Shows how low-phosphorus content required in high-quality steels influences movement of manganese between steel and slag. 6 ref. (D general, CI)

112-D. On the Heterogeneity of Forging Ingots. M. Nepper. *Henry Brutcher Translation* no. 3402, 7 p. Henry Brutcher, Altadena, Calif. (Slightly abridged from *Revue Universelle des Mines,* v.97, ser. 9, no. 4, 1954, p. 96-99.)

Previously abstracted from original. See item 267-D, 1954. (D3, D9, CN)

113-D. (German.) **Possibility of Controlling the Blast Furnace Process by Gas Investigations.** Georg v. Struve. *Metallurgie und Giessereitechnik,* v. 4, no. 12, Dec. 1954, p. 511-522.

Theoretical basis, experiments and their evaluation. Graphs, tables. (D1)

114-D. (German.) **Some Improvements in the Design of the Maerz-Type Open-Hearth Furnace.** Bauart Maerz and Leo Ullsperger. *Metallurgie und Giessereitechnik,* v. 4, no. 12, Dec. 1954, p. 524-528.

Improvements suggested for the head, checkers and arches. Diagrams, tables. (D2)

115-D. (German.) **Simultaneous Desulfurization and Deoxidation of Steel Melts.** Wilhelm Anton Fischer and Helmut Engelbrecht. *Stahl und Eisen,* v. 75, no. 2, Jan. 27, 1955, p. 70-75.

Literature and test data on effects of carbon and silicon content of the melt on sulfur removal. Graphs, table. 8 ref. (D general, ST)

116-D. (Italian and English.) **Integral Cyclic Process Ironworks.** Carlo Crespi. *Industria Meccanica,* v. 6, no. 4, Apr. 1954, p. 203-208.

Design and operation of ultra-modern steel plant in Italy. Diagram, photographs. (D general)

117-D. (Italian.) **A Particular Combustion Process for Rich Gases and Particular Form of Open Hearth Furnace Ends Suitable for the Process.** E. Bolsi. *Metallurgia italiana,* v. 46, no. 11, Nov. 1954, p. 413-416.

Control of air and fuel mixing to obtain maximum efficiency under varying conditions. Diagram, photographs, table. (D2)

118-D. (Italian.) **Horizontal Pouring.** V. Ferrari and D. Bellini. *Metallurgia italiana,* v. 46, no. 11, Nov. 1954, p. 417-420.

Experiments show horizontal pouring of steel ingots is practical and has technological advantages. Diagrams, photographs. (D9, ST)

119-D. (Italian.) **Operational Data and Remarks on Natural-Gas Heated Open-Hearth Furnaces.** C. Stocchi. *Metallurgia italiana,* v. 46, no 12, Dec. 1954, p. 446-449.

Experiences with 75% methane and 25% naphtha mixtures. Tables, diagrams. (D2)

120-D. Blast-Furnace Automation. A. W. Robinson. *Instruments and Automation,* v. 28, Feb. 1955, p. 266-269.

Control of charging program, temperature recording, blast control and gas analysis. Diagrams, photographs. 2 ref. (D1)

121-D. Vacuum Cast 150 Ton Forging Ingots in German Plant. *Iron Age,* v. 175, Feb. 17, 1955, p. 91-94.

Improved metallurgical quality and reduced manufacturing costs through combination of effects. Photographs, tables. (D8, AY)

122-D. Progress Review of Casting Bay and Soaking Pit Practice. L. H.

W. Savage. *Iron & Steel,* v. 28, Feb. 1955, p. 43-48.

Study of heat losses from solidifying ingots and possibilities of retrieving some of this heat in soaking pits. Graphs, diagram. 21 ref. (To be continued.) (D9, F21, ST)

123-D. **Refractories in the Iron and Steel Industry. I. Alumino-Silicates.** Helen Towers. *Iron & Steel* v. 28, Feb. 1955, p. 55-59.

Progress in refractory technology since 1939. 42 ref. (D general)

124-D. **A New Way to Control Arc Furnaces.** Charles W. Vokac. *Iron and Steel Engineer,* v. 32, eb. 1955, p. 76-81; disc., p. 81-91.

Automatic control with a rotary generator coupled to an air counterbalanced hydraulic electrode drive. Diagrams, photographs, oscillograph. (D5, S18)

125-D. **Effect of Temperature and Pouring Speed on Ingot Structure.** *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 120-123 + 6 plates.

Studies on one-ton ingots of nickel-chromium steel. Table, photographs, micrographs. (D9, AY)

126-D. **Ingot Heat Conservation. Cooling of 15-Ton Ingots Between Teeming and Stripping.** L. H. W. Savage and M. D. Ashton. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 132-142.

Measurements of heat losses show that a 25% reduction in standing time between teeming and stripping is feasible and would result in saving of soaking pit fuel. Diagrams, photographs, tables, graphs. 3 ref. (D9, ST)

127-D. **The Formation and Decomposition of Hercynite ($FeO{\cdot}Al_2O_3$).** B. G. Baldwin. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 142-146 + 1 plate.

Effects of various oxide-additions on rate of formation of $FeO{\cdot}Al_2O_3$ under blast furnace conditions. Refractogram, graphs. 5 ref. (D1, Fe)

128-D. **Sulphur Partition Between Gas, Slag, and Metal Phases Under Iron and Steelmaking Conditions.** E. T. Turkdogan. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 147-154.

Data indicate that sulfur reaches equilibrium between slag and metal. Graphs, tables. 31 ref. (D general, CI, ST)

129-D. **Burdening the Blast Furnace. I. Ore. II. Coke. III. Flux. IV. Furnace Operation.** M. W. Lightner. *Steel,* v. 136, Feb. 7, 1955, p. 116 + 6 pages; Feb. 14, 1955, p. 92 + 4 pages; Feb. 21, 1955, p. 82, 94, 87; Feb. 28, 1955, p. 96, 98, 102.

Effects of ore, coke and flux characteristics on blast furnace performance; effects of burden distribution and gas-permeability on furnace operation. Photograph, tables, graphs. (D1, Fe)

130-D. (French.) **Preparation of the Charge at Expérance-Longdoz. Schmidt Rotary Furnaces.** M. Gérard. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 1, 1955, p. 133-168.

Analysis of results on the agglomeration of blast furnace dusts in a rotary furnace; description of installations. Diagrams, tables, graphs. (D1, A5)

131-D. (French.) **Interest in the Use of a Low-Carbon Cast Iron Prepared in the Hot-Blast Cupola as an Open-Hearth Charge.** Boutigny and Barbazanges. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 1, 1955, p. 169-192.

Use and advantages of hot-blast cupola for melting pig iron for open-hearth charges. Graphs, tables, diagrams, photographs. (D2, E10, CI)

132-D. (French.) **Study of the Variation of the Principal Chemical Constituents as a Function of the Sampling Area.** Hentz. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 1, 1955, p. 193-200.

Variations in the carbon, phosphorus and sulfur contents of a steel ingot. Tables, diagrams. (D9, S12, CN)

133-D. (German.) **The Hot-Blast Cupola Furnace in the Steel Plant.** *Archiv für das Eisenhüttenwesen,* v. 26, no. 1, Jan. 1955, p. 1-8.

Effect of temperature and silicon content on carbon in cupola iron; oxygen blast; desulfurizing; heat losses; practical observations. Diagrams, tables, graphs. 28 ref. (D3, E10, CI)

134-D. **Continuously Cast Wide Range of Alloy Steels.** J. Selron. *Iron Age,* v. 175, Feb. 24, 1955, p.88-90.

Continuously cast stainless, heat resisting, electrical and toolsteels show mechanical properties comparable to conventional ingot-cast steels. Photographs, tables. (D9, Q general, AY)

135-D. (Book.) **Blast Furnace, Coke Oven and Raw Materials Committee, Proceedings,** v. 13, 1954. 241 p. American Institute of Mining and Metallurgical Engineers, Inc., 29 W. 39th St., New York 18, N. Y.

Fifteen papers on agglomeration and raw materials, coal and coke, and blast furnace theory and gas. (D1 B22, ST)

136-D. (Book.) **Cost Factors in Selecting Processes for Producing Iron and Steel.** Hamnett P. Munger. 59 p. 1954. Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

Considerations for locating a new iron and steel industry. Calculations for a hypothetical plant. (D general, A4)

137-D. (Book.) **Open Hearth Proceedings,** v. 37, 1954, 360 p. American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York 18, N. Y.

Contains 50 papers covering acid and basic openhearth practice. Papers are individually abstracted. (D2)

138-D. (Hungarian.) **Quality Steel Production.** Endre Szücs. *Kohaszati Lapok,* v. 10, no. 2, Feb. 1955, p. 77-88.

Hungarian and Soviet experiences in the production of unkilled, deep drawing plate material. Tables. 4 ref. (D general, CN)

139-D. (Polish.) **Improvements in Continuous Casting and Direct Rolling of Steel.** Z. Wusatowski. *Hutnik,* v. 21, no. 11, Nov. 1954, p. 370-375.

Status of the process in Poland, Russia and the United States. Micrographs, tables, diagrams. 36 ref. (D9, F23, ST)

140-D. (Polish.) **Increasing the Coefficient of the Utilization of Openhearth Furnace Time by Speeding up Periodic Repairs and Overhauling.** Jozef Szalinski. *Hutnik,* v. 21, no. 12, Dec. 1954, p. 385-390.

Classification of repairs and methods cutting down repair time. Tables. (D2)

141-D. (Russian.) **Complex Deoxidation of Steel by Silicon and Manganese.** I. S. Kulikov and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* no. 10, Oct. 1954, p. 23-30.

Influence of manganese on the deoxidizing ability of silicon; solid and liquid deoxidation products at temperatures of steel production. Tables, graphs. 6 ref. (D general, ST)

142-D. (Russian.) **Influence of Moisture Content of Ore on the Process of Reduction of Iron Oxides.** V. T. Bragin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* no. 10, Oct. 1954, p. 31-38.

Reducibility of limonite in natural state, roasted at 550° C. and after roasting and restoration of original water content. Tables, graphs. 5 ref. (D general, CI)

143-D. **Acid Electric Steelmaking Practice.** C. C. Wissmann. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 13 p.

Problems in determining extent and nature of oxidation reactions. Graphs, table. 8 ref. (D5, ST)

144-D. **Application of Special Elements to Electric Furnace Steels.** A. J. Scheid, Jr., and W. J. Mathews. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954. 8 p.

Effects of various additives on quality of steel. (D5, B22, ST)

145-D. **Basic Electric Melting Practice for Quality Steel.** A. F. Gross. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 16 p.

Effects of melting practice variables on properties of steel. Photographs, graphs, tables. (D5, ST)

146-D. **The Effect of Intermittent Operation on Electric Furnace Refractories.** R. P. Hill. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 1 p.

Practices for returning idle furnaces into production. (D5)

147-D. **Evaluation of Performance of Electric-Arc Furnace Refractories.** M. P. Fedock. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 4 p.

Effects of furnace size and melting practice on refractory consumption. Graphs. (D5, B19)

148-D. **High-Alloy Steel Melting in the Basic Arc Furnace.** Harold C. Templeton. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 3 p.

Melting practice for stainless steel castings. Tables. (D5, SS, CI)

149-D. **Use of Reusable Insulated Low-Volume C&D Hot Tops for Yield Improvement.** Joel C. Carpenter. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 4 p.

Advantages of reusable hot tops. Graph. (D9, D5, ST)

150-D. **Open Hearth Operation and Control. The Use of Instrumentation.**

G. Reginald Bashforth. *British Steelmaker,* v. 21, Mar. 1955, p. 80-86.

Instruments for control of furnace pressure, combustion, regenerator temperature and roof temperature. Diagrams, graphs, table. 18 ref. (D2, ST)

151-D. Oxygen Steelmaking: How Canadian Plant Uses New Process. F. J. McMulkin. *Iron Age,* v. 175, Mar. 31, 1955, p. 75-78.

Equipment and operating procedures; advantages of process. Characteristics of steel produced. Graphs, diagram, photograph. (D8, B22, ST)

152-D. Reducibility of Iron-Ore Lumps. A. E. El-Mehairy. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 219-226.

Effects of porosity on chemical reducibility. Graphs, diagrams, tables. 30 ref. (D general)

153-D. An Improved Model for the Calculation of Heat Transfer in the O.H. Furnace. M. W. Thring and D. Smith. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 227-230.

Model is used to calculate average roof temperature and thermal efficiency during melting period. Diagram, table. 6 ref. (D2)

154-D. The Supply of Scrap to Open-Hearth Furnaces. M. D. J. Brisby and W. O. Pendray. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 252-260.

Causes and corrective procedures for charging delays. Graphs, tables. (D2, ST)

155-D. Charging Delays Due to Furnace Bunching. A Method of Assessment. R. Solt. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 260-264.

Operational analysis of charging. Derives method for forecasting changing demand of furnaces. Graphs, table. 1 ref. (D2, ST)

156-D. Progress in Steelmaking. O_2 Blast Enrichment Shortens Blowing Time. *Steel,* v. 136, Mar. 21, 1955, p. 124, 127, 130.

Development and uses of oxygen in steelmaking. (D3, ST)

157-D. Dephosphorization in a Side-Blown Basic Converter. R. C. Buehl and M. B. Royer. *U. S. Bureau of Mines, Report of Investigations* 5102, Feb. 1955, 20 p.

Modification of side-blown basic-lined converter and operating procedures for dephosphorizing a high-manganese slag. Photographs, diagrams, tables. 8 ref. (D3, D2)

158-D. Oxygen Converter Experiences. F. H. Baer. *Western Machinery and Steel World,* v. 46, Mar. 1955, p. 100-103.

Results of 18 months experience at an Austrian steel plant. Photographs. (D3, ST)

159-D. The Production of Ferromanganese. V. P. Elyutin, Yu. A. Pavlov and B. E. Levin. *Henry Brutcher Translation No.* 3436, 27 p. (Part from Book "The Production of Ferroalloys", Chap. V. 1951. Metallurgizdat, Moscow, Russia.) Henry Brutcher, Altadena, Calif.

Survey of production methods for various grades; other products. Tables, graphs. 3 ref. (D general, Fe, Mn)

160-D. (French.) **Tests With Cowper Apparatuses.** D. Sanna. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 2, 1955, p. 345-382.

Lengthy study of tests to study accumulation of heat, charge losses and heat transfer in blast furnace stoves. Tables, graphs. (D1)

161-D. (French.) **Report of Heat-Accumulation Tests Conducted at the Louvroil Factory on a D. Petit Cowper.** Moutot. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 2, 1955, p. 383-401.

Effects of various operating conditions. Diagrams, tables, graphs. (D1)

162-D. (French.) **Small Converter for the Steel Foundry.** Marcel Guédras. *Métallurgie et la construction mécanique,* v. 87, no. 2, Feb. 1955, p. 103-104.

Economic advantages of the side-blown bessemer over the electric furnace. Graph. (D3, D5, CI)

163-D. (French.) **Results of a Year of Research on the Low-Shaft Blast Furnace.** International Steering Committee. *Revue universelle des mines,* v. 11, ser. 9, no. 2, Feb. 1955, p. 45-67.

Tests and discussion of results obtained. Diagrams, photographs, tables, graphs. 6 ref. (D1)

164-D. (French.) **Desulfurization in a Basic Converter.** J. Wampach and A. Decker. *Revue universelle des mines,* v. 11, ser. 9, no. 2, Feb. 1955, p. 68-75.

Screening of lime for use in converters; factors influencing desulfurization. Tables, graphs. 7 ref. (D3, Fe, Mn)

165-D. Economic Aspects of the Oxygen Converter. W. C. Rueckel and J. W. Irvin. *Iron and Steel Engineer,* v. 32, Mar. 1955, p. 61-63; disc., p. 64-65.

Comparison of costs of oxygen converter with an openhearth furnace operation indicates a net sav-

ing through the use of the converter. Photograph, tables. 4 ref. (D3, D2)

166-D. The Venturi Washer for Blast Furnace Gas. J. E. Eberhardt and H. S. Graham. *Iron and Steel Engineer*, Mar. 1955, v. 32, p. 66-71; disc., p. 71-72.

New venturi-type blast furnace gas washer promises efficient cleaning at water consumptions as low as 5-gal. per 1000 cu. ft. of gas. Diagrams, photographs, graphs. (D1)

167-D. Ferro-Manganese Additions in Open Hearth Steelmaking. Rudolph Tietig, Jr. *Iron and Steel Engineer*, v. 32, Mar. 1955, p. 82-86; disc., p. 86-89.

Controlled addition of manganese at proper point in ladle accomplished by mechanical feeder should give a minimum saving in manganese cost of $0.15 per ingot ton, and for some grades of steel, reductions in cost up to $0.30 a ton. Tables, diagram, photograph. (D2, ST)

168-D. Maintenance of Electric Furnace Bottoms as Practiced in Bethlehem Plant. H. C. Bigge. *Journal of Metals*, v. 7, Mar. 1955, p. 453-456.

Installation and hole-patching procedures for 96% magnesia rammed bottom. Photographs, diagram, tables. 5 ref. (D5, A5)

169-D. Preparation and Arc Melting of High Purity Iron. G. W. P. Rengstorff and H. B. Goodwin. *Journal of Metals*, v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions*, v. 203, Mar. 1955, p. 467-471.

Method for purifying iron in batches of 150 lb. or more. Oxygen, carbon, nitrogen and sulphur are removed from flakes of electrolytic iron by treatment in wet and then dry hydrogen. A special consumable-electrode arc furnace is used to remove hydrogen and to melt the flakes into ingots. Diagrams, tables. 7 ref. (D5, Fe)

170-D. Oxygen Steelmaking Arrives. Thomas F. Hruby. *Steel*, v. 136, Apr. 4, 1955, p. 80-83.

Oxygen steelmaking processes and experiences at two steel plants. Reactions in the steelmaking vessel. Future outlook for oxygen steelmaking. Photographs. (D8)

171-D. (Book.) **Third Report of the Ingot Moulds Sub-Committee. Iron and Steel Institute Special Report No. 52.** 72 p. 1955. The Iron and Steel Institute, 4 Grosvenor Gardens, London, S. W. 1, England. £1:5:0.

Survey and analysis of service conditions in British steelmaking ingot practice; effects of mold composition; properties of mold metals; and design of ingot molds. (D9)

172-D. (Czech.) **High Gas Pressure Blast Furnaces.** Ludvik Broz. *Hutnické Listy*, **v. 10, no. 2, Feb. 1955,** p. 67-73.

Pressure losses; thermal efficiency; gas distribution; quality of pig iron produced. Design changes necessary for blast furnaces. Diagrams, table. 8 ref. (D1, Fe)

173-D. (French.) **Analysis of Performances of Blast Furnaces.** C. G. Thibaut. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, **v. 12, no. 3, 1955, p. 563-582.**

Various correlations between fuel consumption and other characteristics of blast furnace. Tables, graphs. 12 ref. (D1)

174-D. (French.) **Examination of Histograms on the Behavior of Converter Bottoms.** DeLong. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques*, **v. 12, no. 3,** 1955, p. 591-596.

Comparison of lining practice and experience at 16 French steel plants. Graphs, tables. (D3)

175-D. (French.) **Deoxidation of the Bath in a Basic Electric Arc Furnace.** S. Piérard and P. Flament. *Revue de métallurgie*, v. 52, **no. 1, Jan. 1955,** p. 5-26; disc., p. 26-27.

Methods of deoxidizing bath and slag of smelting furnaces to improve quality of steel. Diagram, graphs, tables, micrographs. 10 ref. (D5, ST)

176-D. (French.) **The Decarburization in the Basic Open-Hearth.** M. Urbain and P. Flament. *Revue de métallurgie*, v. 52, no. 3, Mar. 1955, p. 170-187; disc., p. 187-189.

Carbon-oxygen equilibrium; calculation of the partial pressures of carbon monoxide; nitrogen and hydrogen evolution. Graphs, tables. 14 ref. (D2, ST)

177-D. (French.) **Use of Gases in Metallurgy and the "Gazal" Process.** E. Spire. *Revue universelle des mines*, v. 11, ser. 9, no. 3, Mar. 1955, p. 111-120.

Use of gases in preparation of metals. Application of "Gazal" process, consisting of the injection of a gas into liquid metal through a porous refractory plug, in the desilication, denitration and desulfurization of cast iron, and desulfurization of steel. Diagrams, photographs, graphs, tables. 15 ref. (D general, CI, ST)

178-D. (German.) **The Metallurgy of the Blast Furnace.** *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 179-181.

Effects of carbon, manganese, sulfur and silicon at various temperatures. Graphs. (D1)

179-D. Profitable Returns From Expansion of Blast Furnace Slag for Light Weight Aggregate. S. P. Kinney and Fred Osborne. *Blast Furnace and Steel Plant,* v. 43, May 1955, p. 493-501.

Combination of economy, strength, lightness of weight, insulating qualities and appearance of the items produced makes this expanded slag an important factor in construction material field. Tables, photographs. 1 ref. (D1)

180-D. The Role of Sulphur in Iron and Steel Making. T. P. Colclough. *Blast Furnace and Steel Plant,* v. 43, May 1955, p. 502-507.

Control of distribution of sulphur is one of the most important factors in blast furnace operation. Tables. (D1, Fe, ST)

181-D. Ingots and Ingot Production. I. Ingot Structure and Blowhole Formation. G. Reginald Bashforth. *British Steelmaker,* v. 21, Apr. 1955, p. 116-119, 121.

Necessity of accurate control during final stages of refining prior to tapping. Ingot structure and mechanism of solidification and factors influencing blowhole formation. Diagrams, photographs. 27 ref. (D9, N12)

182-D. Separation of Soda Slag From Hot Metals. C. E. A. Shanahan. *Iron & Steel,* v. 28, Apr. 1955, p. 123-127.

Investigation of the rate at which soda slag separates, by flotation, into a surface layer after the metal addition; devising of methods suitable for efficiently separating surface slag phase from the metal. Diagram, tables, graph. 3 ref. (D1)

183-D. Refractories in the Iron and Steel Industry. III. Refractories in the Blast Furnace. Helen Towers. *Iron & Steel,* v. 28, Apr. 1955, p. 129-134.

Review of refractory materials for the stack, bosh and hearth and analysis of factors leading to destruction in each location. 55 ref. (D1)

184-D. Oxygen Steel Produced at Dofasco Can Compete With Open Hearth. F. J. McMulkin. *Journal of Metals,* v. 7, Apr. 1955, p. 530-534.

Describes new plant, practices, vessels and lining, temperature control, flux and slag control and final steel analysis. Diagrams, photographs, graphs. (D8)

185-D. Use of Open Hearth Slag in Blast Furnace Results in Recovery Economies. Edgar B. Speer. *Journal of Metals,* v. 7, Apr. 1955, p. 535-537.

Practices developed which permit usage, with no adverse effect on finished steel analyses or quality. Photograph, graphs, tables. (D1)

186-D. Anatomy of the Open Hearth. John S. Marsh. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Apr. 1955, p. 545-554.

Parts of furnaces, their behavior and functions. Tables, graphs, diagrams. 5 ref. (D2)

187-D. European Vacuum Melting History and Practice. H. H. Scholefield. *Metal Treatment and Drop Forging,* v. 22, Apr. 1955, p. 141-147.

Reviews past achievements and present trends. Diagrams. 10 ref. (D8, C25)

188-D. Sinter Makes Blast Furnace News. *Steel,* v. 136, May 9, 1955, p. 88, 90-91.

Advantages of a 100% sinter-ore charge in blast furnace operation. Photographs. (D1, Fe)

189-D. Experiments on the Melting of Pure Iron in High Vacuum. F. Wever, W. A. Fischer and H. Engelbrecht. *Henry Brutcher Translation No.* 3438, 19 p. (Slightly condensed from *Stahl und Eisen,* v. 74, no. 23, 1954, p. 1515-1521.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 22-D, 1955. (D8, Fe)

190-D. Smelting of Ore-Coal Briquets in the Low-Shaft Furnace. E. E. Hofmann. *Henry Brutcher Translation No.* 3470, 9 p. (Slightly abridged from *Stahl und Eisen,* v. 74, no. 23, 1954, p. 1464-1468.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 19-D, 1955. (D1, CI)

191-D. (English.) **On the Equilibrium Among Silicon in Molten Iron, Blast Furnace Slag and H_2-H_2O Mixed Gas. III. Investigation of the Equilibrium of the Reaction (SiO_2) $CaO-Al_2O_3$ (Sat.) + $2H_2$ = Si + $2H_2O$.** Koji Sanbongi. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 605-613.

Experiments on the equilibrium of reducing reaction of SiO_2 in molten iron by H_2. Tables, graphs, diagram. 11 ref. (D1, Fe, Si)

192-D. (German.) **Drive and Control of Blast-Furnace Turbo-Blowers.** Wer-

ner Runte. *Stahl und Eisen,* v. 75, no. 8, Apr. 21, 1955, p. 461-474.

Prime movers and operation characteristics. Graphs, photographs, diagrams. (D1)

193-D. (German.) **Present State of Development of the Large Gas Engine as a Blowing Engine in Iron and Steelworks.** Hans Möhring. *Stahl und Eisen* v. 75, no. 8, Apr. 21, 1955, p. 474-478.

Present state of development of large gas engine and its ability to compete with other prime movers. Graphs. 8 ref. (D1)

194-D. (German.) **Magnet and Box-Type Charging Cranes of Modern Design for the Scrap Yard of an Open-Hearth Steel Plant.** Otto Berck and Karl Heinz Hüser. *Stahl und Eisen,* v. 75, no. 8, Apr. 21, 1955, p. 499-502.

Requirements to be met by scrap handling cranes. Design and operation of cranes. Photographs, diagrams, tables, graphs. 4 ref. (D2)

195-D. (Russian.) **Investigation of the Reduction of Iron Oxides by Graphite.** V. I. Arkharov, V. N. Bogoslovskii, M. G. Zhuravleva and G. I. Chufarov. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 2, Feb. 1955, p. 272-279.

Vacuum reduction performed at various temperatures; dependence of Wüstite lattice parameter on degree of reduction. Graphs. 10 ref. (D8, Fe)

196-D. Applications in the United States for Some European Improvements in the Blast Furnace Field. Daniel Petit. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 3 p.

Suggestions for using recent European improvements in coking equipment and blast furnace stoves. Table. (D1)

197-D. Blast Furnace Stove Cleaning. L. R. Robinson. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 4 p.

Cleaning methods and costs; effects on production economics. (D1, Fe)

198-D. One Hundred Per Cent Sinter Burden at Gary Works. R. W. Sundquist. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 11 p.

Production runs proved that a blast furnace can be operated successfully and efficiently on a burden of 100% sinter. Tables, diagram, graphs. 11 ref. (D1, Fe)

199-D. A Report on Solid Movement in Blast Furnace Models. J. B. Wagstaff. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 23 p.

Movement of the stock column in the blast furnace investigated by use of two models, a thin slice model and a semicircular one. Diagrams, photographs, graphs. 11 ref. (D1, Fe)

200-D. Statistical Evaluation of Open Hearth Production Factors. E. J. Sobey and R. E. Minto. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 5 p.

Efficacy of using hot metal, effects of production factors on melt quality. Graphs. (D2, ST)

201-D. Use of Open Hearth Slag in Blast Furnaces, and Effect on Open Hearth Practices. E. B. Speer. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1955, 5 p.

Development of practices that permit use of large quantities of slag in a blast furnace; subsequent use of the hot metal in an openhearth furnace. Table, graphs. (D1, D2)

202-D. (Russian.) **Behavior of Sulfur in Gases During Melting in a Blast Furnace.** I. S. Kulikov and L. M. Tsylev. *Izvestiia Aakademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 12, Dec., p. 102-119.

Survey of studies attempting thermodynamic analysis of this problem. Sulfur in various reactions, collation of equations of change of free energies, temperature relation. Tables, graphs. 14 ref. (D1, ST)

203-D. Blast Furnace Bears Under Indian Operating Conditions. H. Schrader and T. V. Cherian. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 27-43 + 1 plate; disc., p. 43.

Results of thorough investigation of a bear removed from a blast furnace of 900 tons daily capacity and dismantled after a campaign of 9½ yr. Diagrams, tables, photographs, graphs. 18 ref. (D1)

204-D. Production of Low-Carbon Ferro-Chrome. A. B. Chatterjea, G. P. Contractor and B. R. Nijhawan. *Indian Institute of Metals Transactions,* v. 7, 1953, p. 45-57; disc., p. 57-60.

Attempts to produce, in one operation, a ferrochrome using ferrosilicon made in India. Tables, graphs. 22 ref. (D8, Cr, Fe)

205-D. Desiliconization of Blast Furnace Hot Metal. J. Pearce. *In-*

dian Institute of Metals, Transactions, v. 7, 1953, p. 251-258.

Principal advantages of keeping low and constant silicon contents in the hot metal supply for basic open-hearth furnaces and the various processes of desiliconization. Diagram. 17 ref. (D1)

206-D. Continuous Casting of Steel. J. S. Morton. *Iron & Steel,* v. 28, May 1955, p. 167-171.

Technical problems; plant procedures. Diagrams, table, graph. 4 ref. (D9, ST)

207-D. Refractories in the Iron and Steel Industry. IV. Other Applications. Helen Towers. *Iron & Steel,* v. 28, May 1955, p. 173-176.

Critical review of refractories for blast furnace stoves and ladles and for casting pits. 60 ref. (D1)

208-D. Gas-Turbo-Driven Blower. C. E. Sayer. *Iron & Steel,* v. 28, May 1955, p. 225-233.

An analysis and evaluation of two European gas-turbine plants used in blast furnace service. Graphs, diagrams. (D1)

209-D. Furnace Bunching. R. Solt. *Iron & Steel,* v. 28, May 1955, p. 233-235.

A method of assessment of charging delays. Table, graphs, diagrams. (D2)

210-D. Topochemical Aspects of Iron Ore Reduction. Gust Bitsianes and T. L. Joseph. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 639-645.

Topochemical behavior of reduction studied in six types of ores of different origin, composition and physical structure. Micrographs, graph. 16 ref. (D general, Fe)

211-D. Special Pig Irons for the Pacific Northwest. John P. Walsted. *U. S. Bureau of Mines, Report of Investigations* 5120, Apr. 1955, 14 p.

Small-scale tests have demonstrated that pig iron of any desired composition may be made by proper proportioning of the smelter charge, using materials available in this region. Tables. 2 ref. (D1, CI)

212-D. (German.) **The Control of the Basic Converter Process by Utilizing the Thermal Radiation of the Bath and the Spectrum of the Converter Flame.** Franz Wever, Walter Koch, Horst Höfermann, Bernd Alexander Steinkopf, Helmut Knüppel, Karl Ernst Mayer and Gert Wiethoff. *Stahl und Eisen,* v. 75, no. 9, May 5, 1955, p. 549-559.

Control of the reaction process by means of the temperature and spectrometer curve. Diagrams, graphs, micrographs. 10 ref. (D3)

213-D. (Polish.) **Economizing on the Ferromanganese in the Melting of Steel.** L. Andrejew. *Hutnik,* v. 22, no. 1, 1955, p. 30-32.

Less loss of manganese results from addition of ferromanganese to the teeming ladle instead of to the openhearth furnace. Chemical analyses and mechanical properties presented for steels thus deoxidized. Graphs, tables.
(D2, D9, Q general, ST)

214-D. (Russian.) **Influence of the Circulation of Coke on the Burning Process in Blast Furnaces.** I. P. Bardin, M. Ia. Ostroukhov, L. Z. Khodak and L. M. Tsylev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 80-95 + 1 plate.

Conditions of operation; changing composition of gases in the various zones of the furnace; effect of blast conditions. Diagrams, tables, graphs, photographs. 12 ref. (D1)

215-D. (Russian.) **Behavior of Zinc in Blast Furnaces.** A. L. Zagianskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 96-108.

Harmful effects of zinc; zoning and peculiarities of formation of zinc oxide; growth of the refractory lining; reactions of zinc in connection with the melting of materials containing zinc. Table. 25 ref. (D1, Zn)

216-D. Ingots and Ingot Production. II. Ingot Defects. G. Reginald Bashforth. *British Steelmaker,* v. 21, May 1955, p. 146-150.

Various defects which may arise and their probable causes. Particular attention is devoted to ingot cracks. Diagrams. 16 ref. (D9, ST)

217-D. Continuous Casting of Steel. J. S. Morton. *British Steelmaker,* v. 21, May 1955, p. 152-157.

General review covering the underlying aims and economic significance of the process, technical problems which have been encountered, operation of a typical plant, useful survey of all the known techniques evolved to date. Photograph, graph, diagram, table. 4 ref. (D9, ST)

218-D. Experimental Production of Pig Iron and Steel From Cominco Iron Concentrates. B. G. Hunt, E. J. Kwasney, W. P. Campbell and S. L. Gertsman. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 517, May

1955, p. 281-291; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 147-157.

Details are given of the steelmaking and fabrication procedure, of the visual and microscopic examination and of the extensive series of tests on the steel produced. Photographs, micrographs, diagrams, tables, graphs. 2 ref. (D general, Fe, ST)

219-D. Rapid Method of Relining a Blast Furnace. Bruno Vezzani. *Iron and Steel Engineer,* v. 32, May 1955, p. 111-117; disc., p. 117-118.

The unusually fast performance of relining this blast furnace was accomplished primarily because of excellent advance planning and wholehearted cooperation between the various groups on the job—as a result, relining of furnace was accomplished in the short time of 15 days 9½ hr. Tables, diagrams. (D1)

220-D. Evolution in Steel Melting. E. C. Wright. *Metal Progress,* v. 67, June 1955, p. 100-101.

Some technical and economic consideration that have directed attention to the disadvantages of the basic openhearth furnace operation. (D general, ST)

221-D. (French.) **Contribution to the Study of Silicate Inclusions in Killed Steel.** R. Collée. *Revue universelle des mines,* v. 11, ser. 9, Apr. 1955, p. 151-156.

A new hypothesis concerning the formation of silicate inclusions. Experimental proof. Micrographs, tables. 23 ref. (D general, ST)

222-D. (Russian.) **Mechanism of the Desulfurizing of Iron.** I. L. Korkiia, O. A. Esin and V. V. Mikhailov. *Doklady Akademii Nauk SSSR,* v. 101, no. 6, Apr. 21, 1955, p. 1065-1067.

A critique of the theories of Chang, Goldman and others. Equations for reactions in the slag. Table, diagram. 4 ref. (D1, Fe)

223-D. (Russian.) **Study of Wetting Ability of Slags in the Electric-Furnace Melting of Steel.** A. I. Kholodov, S. I. Suchil'nikov and I. P. Malkin. *Doklady Akademii Nauk SSSR,* v. 101, no. 6, Apr. 21, 1955, p. 1093-1096.

Comparison of wettability of iron by synthetic and foundry slags. Determining the boundary angles of the wettability of a metal by a slag. Tables, graphs, diagrams. 9 ref. (D5, B21, ST, CI)

224-D. Blast-Furnace Design and Refractory Wear. *Foundry Trade Journal,* v. 98, May 19, 1955, p. 545-547.

German experience with carbon-block linings which points a number of parallel applications to foundry furnaces. (D1, E10)

225-D. Air Flow in Beds of Granular Solids. J. B. Wagstaff and E. A. Nirmaier. *Industrial and Engineering Chemistry,* v. 47, June 1955, p. 1129-1135.

Five earlier works compared in the first step of studying gas flow and its reactions in a blast furnace. Tables, graphs. 14 ref. (D1)

226-D. Hydrogen in Steelmaking. III. H. Epstein, J. H. Walsh and T. B. King. *Industrial Heating,* v. 22, May 1955, p. 990, 992.

Rate of hydrogen elimination from the bath by a flushing calculation. Graph. 6 ref. (D2, ST)

227-D. Large Electric Furnaces. D. F. Campbell. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 107-113 + 2 plates.

Past, present and future status of the large arc furnace as a producer of carbon and low alloy steel in large quantities. Table, photographs, diagram. 1 ref. (D5, CN, AY)

228-D. The Operation of a 60-Ton Arc Furnace. R. Wilcock. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 113-116 + 1 plate.

Description of operating experience during the first few months of production covering melting, slag reduction and oxidation, temperature controls, electrode consumption, refractory performance and quality of steel produced. Photographs, tables. (D5, AY)

229-D. Observations of Stainless Steel Melting Practice. D. C. Hilty, H. P. Rassbach and Walter Crafts. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 116-128.

Melting practice for stainless steels reviewed and rationalized with theoretical considerations to provide bases for prediction and control of the process and the design of the most economical practices. Graphs, tables. 23 ref. (D general, SS)

230-D. Rate of Desulphurization of Carbon-Saturated Iron by Blast-Furnace Slags. C. E. A. Shanahan. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 140-144.

Laboratory experiments show that large degrees of agitation do not produce equivalent increases in rate of desulphurization of liquid iron by blast furnace slags. Graph. 8 ref. (D1, Fe)

231-D. The Design and Construction of Lackenby Steelworks. I. Lay-

out, General Design, and Construction. II. Furnaces, Mixers, and Fuel-Supply Systems. A. P. Clark and S. Cornforth. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 180-188 + 4 plates.

Plant designed for annual output of 625,000 tons of ingots from five 360-ton openhearth tilting furnaces, and two 600-ton active mixers, working 50 to 80% hot metal and producing mainly structural steels. Diagrams, photographs. (D2, A5, ST)

232-D. (German.) **What Reactions Cause the Foaming of Slag in the Basic Open-Hearth Process?** Kurt Fellcht. *Metallurgie,* v. 5, no. 3, Mar. 1955, p. 85-98.

Theoretical analysis and experimental study. Graphs, diagrams, tables, photographs, micrographs. (D2)

233-D. (German.) **Investigations on the Reducing Conditions in the Blast Furnace.** Jakob Willems, Willy Oelsen and Hans Genz. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 618-624.

Comparison of reducing conditions when smelting two burdens in the same furnace and smelting of one burden in two different furnaces. Graphs, diagrams. 11 ref. (D1)

234-D. (German.) **Tasks and Problems of Pig-Iron Production in Switzerland.** Hans Georg Erne. *von Roll Mitteilungen,* v. 13, nos. 1-2, Jan.-June 1954, p. 1-12.

Properties of electric pig iron. Graphs, map, diagram, table, micrographs. 15 ref. (D8)

235-D. (German.) **The Low-Shaft Oxygen Furnace.** Hans Georg Erne. *von Roll Mitteilungen,* v. 13, nos. 1-2, Jan.-June 1954, p. 13-23.

Pig iron can be melted from ore or steel scrap and gray cast iron from steel or cast iron scrap. Diagrams, tables, graphs. 7 ref. (D1, CI)

236-D. (Hungarian.) **Decreasing the Burning Losses of Deoxidizing Materials, and Endogenous Slag in Steel During Open-Hearth Steel Production. I.** Dezso Csépai. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 211-214.

Investigation of the physical chemistry of the oxidation of Mn in the openhearth furnace. Experiments for optimum transition of the manganese of the charge into the steel. Graphs, tables. (To be continued.) (D2, ST)

237-D. (Polish.) **Device for Measuring the Dynamic Pressure in Blast Furnace Tuyeres.** A. Maslanka. *Hutnik,* v. 22, no. 3, Mar. 1955, *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa,* v. 6, no. 3, 1955, p. 10-12.

Design, operation, measurement of temperature and blast flow. Diagrams, table. (D1)

238-D. (Russian.) **Mechanism of the Dephosphorizing Process of Liquid Iron by Slag.** O. A. Esin and V. N. Shikhov. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 327-330.

Influence of the original content of phosphorus; determination of the reaction order for the passage of phosphorus from the metal into the slag and the reverse process; temperature and time factors; investigation by tracer elements. Graphs, diagram. 6 ref. (D general, Fe)

239-D. (Russian.) **Investigation of the Limiting Stages of the Process of Desulfurizing Liquid Iron by Means of Slag.** O. A. Esin and V. N. Shikhov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 105-112.

Effect of original concentration of the sulfur in the metal on the rate of its passage into various slags. Tables, graphs, 12 ref. (D general, Fe)

240-D. Production Control of Quality Steels. R. W. Graham. *Blast Furnace and Steel Plant,* v. 43, June, 1955, p. 619-626.

Consideration of the present day steelmaking problem from the viewpoint of an operator who is responsible not only for quality, but also for plant economics. Photographs, graphs. (D general, A4, ST)

241-D. Coke Quality and Blast Furnace Operating Practice. W. T. Rogers. *Blast Furnace and Steel Plant,* v. 43, June 1955, p. 627-634.

By the use of simultaneous analysis of blast furnace operating variables and coke quality characteristics, the independent effect of coke quality on blast furnace performance can be evaluated in an uncomplicated manner. Tables, graphs. 1 ref. (D1)

242-D. Pneumatic Steelmaking Processes. I. D. J. Carney. *Blast Furnace and Steel Plant* v. 43, June 1955, p. 635-640.

Some of the processes, advantages and disadvantages, properties and uses, chemistry, thermal requirements, deoxidation reactions, nitrogen control. Graphs, tables. (To be continued.) (D8, ST)

243-D. Some Chemical Engineering Problems of the Iron and Steel Industry. A. H. Leckie. *Chemical and*

Process Engineering, v. 36, June 1955, p. 211-214.

What the chemical engineer can contribute to improvement of present processes or adoption of new ones, viz. the Linz-Dusenverfahren process and continuous casting. Table, graphs, photographs. 13 ref. (D general)

244-D. Continuous Casting at Atlas Steels, Ltd. John F. Black and F. W. Rys. *Iron and Steel Engineer,* v. 32, June 1955, p. 78-87; disc., p. 87.

Principles, requirements, equipment, operating procedures. Photographs, diagrams, tables. (D9, ST)

245-D. Extending Blast Furnace Stack Life After Appearance of Hot Spots. R. W. Sundquist. *Iron and Steel Engineer,* v. 32, June 1955, p. 88-94; disc., p. 94-95.

Detection procedures, installation of shell sprays, placing grout installation of cooling plates. Tables, photographs, diagrams. (D1)

246-D. Developments in Design of Modern Open Hearths. Jay J. Seaver. *Iron and Steel Engineer,* v. 32, June 1955, p. 96-99; disc., p. 99-100.

Provisions for sealing of furnaces to stop infiltration, positive draft, clean gas, improved checker brick and improved gas flow. Diagrams, photograph. (D2)

247-D. New Method Expands Slag for Aggregate Use. S. P. Kinney. *Iron and Steel Engineer,* v. 32, June 1955, p. 127-128.

Kinney-Osborne process for expanding blast furnace slag for use as a light-weight aggregate. Photographs, tables. (D1, A8)

248-D. Gary Blast Furnace Operates Successfully on 100 Pct. Sinter Burden. R. W. Sundquist. *Journal of Metals,* v. 7, June 1955, p. 737-741.

Results of approximately nine months of operation on No. 12 furnace at U. S. Steel Corp.'s Gary Works. Tables, graphs, diagram. 10 ref. (D1)

249-D. New Life for Metals. *Steel,* v. 137, July 4, 1955, p. 82-83.

Use of vacuum melting in producing purer metals. Improving mechanical properties of old alloys and production of new ones. Photographs, diagrams. (D8, C25)

250-D. The Oxygen Low-Shaft Furnace and Its Operation. H. Erne. *Henry Brutcher Translation No.* 3420, 16 p. (From *Stahl und Eisen,* v. 74, no. 25, 1954, p. 1644-1648.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 45-D, 1955. (D1, CI)

251-D. Deoxidation of Steel With Silicon and Manganese. I. S. Kulikov and A. M. Samarin. *Henry Brutcher Translation No.* 3501, 12 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1954 no. 10, Oct., p. 23-30.) Henry Brutcher, Altadena, Calif.

Thermodynamic study of deoxidation of steel based on theory of real solutions for oxide systems. Calculation of composition of products of deoxidation with silicon and manganese at different concentrations of these elements in the bath. Tables, graphs. 6 ref. (D2, ST)

252-D. Effect of Moisture in Ores Upon the Reduction of Iron Oxides. V. T. Bragin. *Henry Brutcher, Translation No.* 3509, 12 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1954, no. 10, Oct., p. 31-38.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 142-D, 1955. (D general, CI)

253-D. (Czech.) **Chief Parameters of Open-Hearth Furnaces.** Vladimir Balabanov. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 266-278.

Detailed literature survey and conclusions based on the author's experience, relating to the fuel effects on furnace performance, specific heat consumption, gas velocity and the preheating and hearth areas. Tables, graphs, diagrams. 21 ref. (D2)

254-D. (French.) **Consumption of Water at Iron and Steel Plants.** Marcel Steffes and Pierre Mosel. *Centre Belge d'Etude et de Documentation des Eaux, Bulletin (trimestrielle),* 1955, no. 28, p. 91-98.

Study of supply, control and use of cooling, washery and feed waters. Diagrams, graphs, tables. (D general)

255-D. (French.) **Corrosion and Erosion of Ladle Bricks. Laboratory Testing Methods.** Ph. Visseriat. *Silicates Industriels,* v. 20, no. 5, May 1955, p. 200-204.

Physico-chemical theory of corrosion of bricks by molten steel. Study of ladles from point of view of refractory coatings. Five testing methods. (D9)

256-D. (German.) **Model Experiments on the Reversal of Flow in the Head of Open-Hearth Cold-Gas Furnaces.** Michael Hansen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 243-251.

Experiments on the optimum design of the head of above furnace for returning the rising air to the melt. Diagrams, graphs, tables. 3 ref. (D2)

257-D. (German.) **Reduction Experiments on Iron Ores.** Herman Schenck. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 682-690.

Measurement and effects of the permeability to gas and of the voids in the ore. Effect of particle size, speed and composition of gases, stability of ores and gangue on reducibility. Photographs graphs, micrographs. 14 ref. (D1)

258-D. (German.) **Results of an Experimental Operation of a Blast Furnace With Ferro-Coke.** Helmut Linde, Kurt Schwindt, and Max Paschke. *Stahl und Eisen,* v. 75 no. 11, June 2, 1955, p. 691-693.

Details of the blast furnace and experimental conditions. Data on composition of pig iron, increase of silicon content by use of ferrocoke, and coke consumption. Tables, graphs. 2 ref. (D1)

259-D. (German.) **Description and First Operation Data of the New Open-Hearth Steel Plant No. II at Huckingen.** Karl Georg Speith and Helmut Kobusch. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 694-699.

The plant, its erection, starting and first operation data, charging and melting capacity. Photographs, diagrams, graphs. (D2)

260-D. (Polish.) **Determination of the Optimum Conditions for the Reduction of Metallic Oxides by Carbon.** Emilian Iwanciw. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 131-153.

Mechanism of the process; experimental data include temperature and pressure relations to reduction. Graphs, tables. 9 ref. (D general, C general)

261-D. (Polish.) **Preparation of Casting Ladles for Tapping Steel Melts.** Wladyslaw Hansel. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p. 36-43.

Effects of operating variables on the life of ladle refractories; proper types and installation of refractory linings. Photographs, graphs, diagrams. 3 ref. (D9 ST)

262-D. (Polish.) **Economic Utilization of Ferromanganese in the Deoxidation of Steel.** Leonid Andrejew. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p. 45-47.

Steelmaking methods; comparisons of metal properties and burn-off losses of manganese when additions are made in the ladle and in the furnace. Tables. (D2, ST)

263-D. (Polish.) **Utilization of Electrodes in Electric Furnaces.** Eugeniusz Horoszko. *Wiadomosci Hutnicze,* v. 11, no. 4, Apr. 1955, p. 98-102.

Physical and chemical properties of electrodes; transportation, storage, installation and their behavior in furnaces. Table, diagrams. (D5, C21)

264-D. **Oxygen Improves Competitive Position of Older Openhearth.** G. C. Lawton. *Iron Age,* v. 176, July 14, 1955, p. 112-113.

Much improved fuel input, greater flexibility in scrap used, faster meltdown and few long soaking periods are advantages. Photograph. (D2, ST)

265-D. (Portuguese.) **Production of Aluminothermic Ferrochromium and Ferrotungsten.** Dalcy Horta Machado. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 37, Oct. 1954, p. 385-389.

Brazilian patent for new variation of thermite process. Results compared with those by electric furnace process. (D8, Fe, Cr, W)

266-D. (Hungarian.) **Decreasing the Burning Losses of Deoxidizing Materials (Manganese, Silicon, Aluminum) and the Quantity of Endogenous Slag of Steel in Open-Hearth Steel Production. II.** Dezso Csépai. *Kohaszati Lapok,* v. 10, no. 6, June 1955, p. 257-262.

Industrial experiments for decreasing endogenous slag inclusions in steel. Detailed production data on low sulfur and phosphorus steel production. Photograph, micrograph, tables. (D2, ST)

267-D. (Hungarian.) **Production of Ferromolybdenum Directly From Molybdenum Disulfide.** Laszlo Visnyovszky. *Kohaszati Lapok,* v. 10, no. 6, June 1955, p. 272-275.

Various production methods and their economic comparison for yield. Tables, graphs. 6 ref. (D8, Fe, Mo)

268-D. (Polish.) **Desulfurization of Blast Furnace Pig Iron.** A. Ofiok. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 106-114.

Use of soda, lime salt or sodium hydroxide outside the furnace; evaluation of their relative effectiveness. Tables, graphs, diagrams. 25 ref. (D1, CI)

269-D. (Russian.) **Kinetics of the Distribution of Sulfur Between Liquid Iron and Slag.** O. A. Esin and V. N. Shikhov. *Doklady Akademii Nauk SSSR,* v. 102, no. 3, May 21, 1955, p. 583-586.

Related rate of desulfurization of molten iron by basic and acid slags to concentration of sulfur in the slags. Graphs, table. 6 ref. (D general, P12, Fe)

270-D. (Russian.) **Influence of Liquid-Steel Temperature on Ingot Struc-**

ture. A. P. Pronov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 4, Apr., p. 58-62 + 1 plate.

Macrostructure and crystallization pattern of a basic openhearth steel ingot. Optimum dimensions of ingot and adequate thermal insulation of deadhead part, as well as proper degree of overheating above melting point. Photograph, diagram. 7 ref. (D9, M28, ST)

271-D. (Russian.) **Investigation of the Kinetics of the Dephosphorization of Liquid Iron by Slag.** O. A. Esin and V. N. Shikhov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 3, Mar., p. 79-89.

Compares distribution indices of phosphorus and its radioactive isotope; chemical analysis and radiation measurement; effect of phase surface separation and height of slag layer; rate of direct and reverse reactions; effect of original phosphorus concentration in metal and slag composition. Graphs, tables. 12 ref. (D general, P12, Fe)

272-D. (Russian.) **Activity of Oxygen in Liquid Iron.** V. V. Avtrin, A. Iu. Poliakov and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 3, Mar., p. 90-107.

Experimental equipment for preparing gas mixtures; quartz high-frequency melting furnace. Relation of coefficient of activity of oxygen to gas temperature and composition. Tables, graphs, diagrams, photographs, micrograph. 15 ref. (D1, P12, Fe)

273-D. (Russian.) **Study of the Static Pressure Change With Respect to the Blast Furnace, Height and Measurement of Temperature in the Hearth.** N. N. Chernov, I. F. Domnitskii and G. S. Manchenko. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 4, Apr., p. 63-72.

New method of regulating furnace pressures. Reliable temperature measurement at tuyeres, etc., provide basis for automatic control of heating. Graphs, diagrams. 5 ref. (D1, S16, S18)

274-D. Pioneering in New Developments in a Specialty Steel Mill. H. George De Young. *American Iron and Steel Institute, Preprint,* 1955, 47 p.

Developments in continuous casting, scarfing, rolling, pickling and annealing. Photographs, tables, graphs, micrographs, diagrams. (D9, F general, ST)

275-D. The Role of Slag Composition in Open Hearth Desulphurization and Oxidation. H. L. Bishop, T. B. King and N. J. Grant. *American Iron and Steel Institute, Preprint,* 1955, 18 p.

Considers the oxidizing power of the slag and the partition of sulfur between slag and metal as these are related to slag composition. Graphs, phase diagrams. 12 ref. (D2)

276-D. Cleaning of Open Hearth Stack Gases. Leslie Silverman. *Blast Furnace and Steel Plant,* v. 43, July 1955, p. 735-744, 752.

Requirements for cleaning, present methods of cleaning, agglomeration studies and their relation to filtration studies and conclusions drawn from the study. Photographs, micrographs, diagrams, tables, graph. 5 ref. (D2)

277-D. Pneumatic Steelmaking Processes. II. D. J. Carney. *Blast Furnace and Steel Plant,* v. 43, July 1955, p. 753-760.

Use of oxygen in acid bottom blown bessemers and the processes, requirements, control and reactions of the basic bessemer. Tables, graphs. 11 ref. (To be continued.) (D3, ST)

278-D. The Use of Sintered Pyrrhotite Residues in the Production of Low Phosphorus Pig Iron. L. A. Miller. *Blast Furnace and Steel Plant,* v. 43, July 1955, p. 761-764, 794-795.

Operation of the furnace with a burden of 88% Copperhill sinter and 12% Brown Ore. Description of furnace, and low and high blast heat practice. Tables, diagrams, graph. (D1, CI)

279-D. Synchronous Condensers for Steel Mill Service. E. I. Pollard. *Iron and Steel Engineer,* v. 32, July 1955, p. 129-134; disc., p. 134-135.

Use of a synchronous condenser, either alone or in combination with a buffer reactor or a series capacitor or both, to provide an effective method of keeping voltage flicker due to reactive load swings of an arc furnace within acceptable limits. Diagrams, graphs, photographs. 7 ref. (D5)

280-D. Vacuum Furnaces Will Make Better Steels. *Iron and Steel Engineer,* v. 32, July 1955, p. 136, 139-140.

Design features, application, production, control and operation of the furnace; production and application of specialized vacuum melted alloys. Diagram, photographs. (D8, ST)

281-D. (Czech.) **Experimental Comparison of Properties of Carbon Steel**

Made in Acid and in Basic Lined Open-Hearth Furnace. Zdenek Eminger and Frantisek Kinsky. *Hutnické Listy,* v. 10, no. 6, June 1955, p. 329-345.

Compares mechanical physical, physico-chemical and technological properties. Cast and forged carbon-vanadium steels, for the production of large crank shafts, are produced especially for this study. Tables, graphs, diagrams, photographs, micrographs. 8 ref.
(D2, Q general, ST)

282-D. (French.) **Influence of Temperature During Refining on the Nitrogen Content of Basic Bessemer Steel.** B. Trentini, P. Leroy and M. Gombert. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 418-427.

Utilization of a two-color pyrometer, at the bottom of a 19-ton converter, and direct recording of the refining permits a comparison of temperature curves corresponding to various additions, and facilitates a study of the effect of cooling additions charged during refining. Graphs, tables. 15 ref. (D3, CN)

283-D. The Axial-Flow Compressor in Industry. A. Schramm. *Brown Boveri Review,* v. 41, no. 11, Nov. 1954, p. 395-404.

Performance characteristics of compressors for use in blast furnaces, bessemer converters, chemical plants and wind tunnels. Graphs, photographs, diagram. 14 ref. (D1, D3)

284-D. Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 34, July 1955, p. 161-162.

Preparation of steel in the bessemer converter and electric arc furnace. Special procedures for production of steel for casting. Graphs, tables. (To be continued.)
(D3, D5, E10, ST)

285-D. Phase Equilibrium Studies of Steel Plant Refractories Systems. V. E. F. Osborn. *Industrial Heating,* v. 22, July 1955, p. 1459 + 4 pages.

Effects of alumina and chromium oxide on refractories for steelmaking. Graphs, diagrams. 1 ref.
(D general, B19)

286-D. Brazilian Charcoal Blast Furnace Practice. R. G. Walker. *Iron & Steel,* v. 28, June 1955, p. 297-300.

Improving operations, comparison with other processes, low-shaft blast furnaces, development of charcoal blast furnaces. Table, diagrams.
(D1)

287-D. Ore Fines Utilized in Low Shaft Furnace to Produce Thomas Pig Iron. P. Coheur. *Journal of Metals,* v. 7, Aug. 1955, p. 872-876.

Pilot plant studies for production of low-silicon pig iron from raw materials which cannot be used in conventional blast furnaces because of fineness or other reasons. Tables, graphs, diagram. 5 ref.
(D1, CI)

288-D. Vacuum Steel: Boost to Bearings. Leland D. Cobb. *Steel,* v 137, Aug. 15, 1955, p. 136-137.

Elimination of inclusions in ball bearing toolsteels by use of vacuum melting. Micrographs, photograph.
(D8, T7, TS)

289-D. Study of the Deoxidation of Steel by Vacuum Melting. J. Thomas and L. Moreau. *Henry Brutcher Translation No.* 3350, 10 p. (From *Revue de Métallurgie,* v. 43, nos. 7-8, 1946, p. 204-207.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 2-161, 1947. (D8, ST)

290-D. Investigation of the Oxidizing Zone in a Blast Furnace Working on Blast of Normal and of Increased Moisture Content. N. N. Chernov. *Henry Brutcher Translation No.* 3449, 15 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1954, no. 7, p. 105-115.) Henry Brutcher, Altadena, Calif.

Review of previous work on the extent of the oxidizing zone; conflicting U. S. and Russian opinions regarding the effect of water enrichment of the blast and size of the oxidizing zone; possible explanations of effect of increased moisture content of blast. Graphs, diagrams. 15 ref. (D1)

291-D. The Hot-Blast Cupola in the Steel Plant. Th. Kootz and H. Rellermeyer. *Henry Brutcher Translation No.* 3513, 16 p. (Abridged from *Archiv für das Eisenhuttenwesen,* v. 26, no. 1, 1955, p. 1-8.) Henry Brutcher, Altadena, Calif.

Use of cupola iron as hot metal for the openhearth furnace to boost production; investigational set-up, procedure and comments on operational technique. Tables, graphs, diagrams. 10 ref. (D2, E10, ST)

292-D. Processes Occurring in the Bosh of the Blast Furnace. I. P. Bardin and M. Ya. Ostroukhov. *Henry Brutcher Translation No.* 3525, 12 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1954, no. 3, Mar., p. 72-81.) Henry Brutcher, Altadena, Calif.

Importance of state of materials

in this zone for the permeability of the stock column; investigational procedure and sampling technique. Micrographs, graphs, tables. 2 ref. (D1)

293-D. (French.) **Japanese Tests on the Injection of Oxygen-Enriched Blast and Powdery Materials Into the Crucible of a Small, Experimental Blast Furnace.** *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 6, 1955, p. 1061-1086.

Injection permits control of cast iron composition and of crucible temperature and rapid re-establishment of normal operating conditions. Tables, diagrams, graphs. (D1, CI)

294-D. (French.) **Inquiry on the Shutting Down of Converters for Repairing Lining or Changing the Bottom.** Lanquetin. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 6, 1955, p. 1215-1226.

Presents tabulation of various steps and precautions in the operations. Tables. (D3)

295-D. (French.) **Contribution to the Study of the Role of Manganese in Refining in the Thomas Converter.** P. Leroy. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 6, 1955, p. 1227-1233.

Investigates influence of manganese content of cast irons on quality of steel produced. Graphs. (D3)

296-D. (French.) **Desulfurization by Stirring With Slags.** René Perrin. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 473-476

Principles of steel desulfurization processes, especiallly stirring with melted slags, and fundamentals of a new method of simultaneous desiliconization and desulfurization of steel, using a single slag of appropriate composition. (D3, ST)

297-D. (Japanese.) **On the Bessemerizing Process in the Hearth of Blast Furnace.** Kuro Kanamori. *Institute of Industrial Science, Report, (University of Tokyo),* v. 4, no. 4, Mar. 1955, 64 p.

Production of pig iron with low sulphur (0.01%); activation of nickel and chromium in the furnace bath. Graphs, diagrams, tables. (D1, Fe)

298-D. (Swedish.) **A Special Type of Ingot Cracks Caused by Certain Impurities.** Paul Björnson and Helmer Nathorst. *Jernkontorets Annaler,* v. 139, no. 6, 1955, p. 412-438.

Special type of ingot cracks are found when steel contains copper and tin, which segregate to the primary grain boundaries on cooling, forming precipitate of probably liquid copper-tin phase. Mechanism of crack formation. Tables, micrographs, diagrams. 12 ref. (D9, N7, ST)

299-D. **Life of Ingot Moulds: Condition of Service, Mould Material and Design, and Metal Composition.** *Foundry Trade Journal,* v. 99, July 28, 1955, p. 101-102.

Results and conclusions of extensive studies of mold performance with the aim towards reducing their consumption. Graph, table. (D9)

300-D. **Speeding Open Hearth Charging.** M. D. J. Brisby and W. O. Pendray. *Iron & Steel,* v. 28, Aug. 1955, p. 403-404.

Common causes of slowed charging time and how efficiency can be increased without cost. Graphs. 1 ref. (D2)

301-D. **Application of Continuous Casting to Steel.** J. Savage. *Metal Treatment and Drop Forging,* v. 22, July 1955, p. 277-287.

Application in 11 plants operating on wide range of steels and differences between the three principal processes as concerns billet skin rupture. Outlines automatic controls. Graphs, diagrams. 17 ref. (D9, ST)

302-D. **Let's Make Basic Steel.** John P. Holt. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 33-37.

Problems involved and reasons for changing from acid to basic steelmaking. Photographs, table. 7 ref. (D5, ST)

303-D. (Czech.) **The Oxidation Period in Basic Electric Arc-Furnaces.** Premysl Fremunt and Pavel Pant. *Slévarenstvi,* v. 3, no. 7, July 1955, p. 202-207.

Methods of lowering the phosphorus content in the steel by regulating charge temperature of the slag composition. Effect of various methods of predeoxidizing steel on the number of nonmetallic inclusions. Tables, graphs. 7 ref. (D5, ST)

304-D. (French.) **Pre-Refining of Melt in Ladle by Means of Pure Oxygen. Results Obtained in a Pilot-Plant.** P. Leroy and L. Septier. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 7, 1955, p. 1383-1402.

Oxygen, blown into a full ladle by a vertical injector, proves to be

a simple and effective means of desiliconizing the pig iron. Graphs, photographs, tables, diagrams. 6 ref. (D general, ST)

305-D. (French.) **Additional Information on the Problem of Bricks for Gates in Steel Casting.** L. Halm. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 7, 1955, p. 1403-1423.
Analysis of factors inducing the wear of the gate bricks, such as steel composition, pouring temperature, ladle capacity, and time of pouring operation; characteristics of the gate bricks; optimum composition depending on the prevailing conditions. Tables, graphs, photographs, micrographs. 3 ref. (D9, F22, ST)

306-D. (French.) **Silico-Alumina Refractories for Open-Hearth Furnaces. Standardization of Dimensions. Physico-Chemical Characteristics.** M. Savarre. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 7, 1955, p. 1425-1432.
Different types of refractories; necessity of standardization of dimensions and composition of bricks for individual purposes (furnace, gate and ladle); influence of types of refractories on the cost of steel production. Tables, diagram. (D2, ST)

307-D. (German.) **The Relations Between Blast Furnace Operation and Pig Iron Quality and Their Effect on the Quality of the Basic Converter Steel.** Walter Hummel, Walter Loorz and Willy Oelsen. *Stahl und Eisen,* v. 75, no. 14, July 14, 1955, p. 885-900.
Observations made when tapping; effects of the flow of gases and of the burdening conditions on the characteristic data; degree of pig iron reduction and quality of the basic converter steel. Diagrams, graphs, tables. 13 ref. (D1, D3, ST)

308-D. (German.) **Measures to Be Taken for Improving the Life of Slag Ladles.** Eugen Betting. *Stahl und Eisen,* v. 75, no. 14, July 14, 1955, p. 906-911.
Relations between stresses sustained by the ladle material, effect of heat, structural design of parts, impact loads in operation. Conclusions for the design of the ladle support and ladle wall, and for choice of material. Table, diagrams, graphs, photographs. 1 ref. (D9, B21)

309-D. Use of Mould Dressings in Steelmaking. D. R. Thornton. *British Steelmaker,* v. 21, Aug. 1955, p. 252-257.
Use of dressings on the inner surface of the mold to extend the permissible range of values of teeming speed and temperature without detrimental effects on surface quality. Diagrams, graphs. 8 ref. (D9, ST)

310-D. Hydraulic Systems on Charging Machines and Manipulators. R. S. Bogar. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 57-68; disc., p. 68-69.
Features of hydraulic systems on steel plant charging equipment, need for regular inspection, periodic adjustments, regularly scheduled tests by operating personnel. Diagrams. (D2, ST)

311-D. Some Aspects of Open Hearth Waste Gas Analysis Control. F. P. Hubbell. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 85-88; disc., p. 88-89.
Application to one furnace in a shop where operation of a number of furnaces are essentially alike, use of information to regulate practice and schedules of all furnace units. Photographs. (D2, S11)

312-D. Erection and Operation of Blast Furnaces in Chile. Thomas W. Plante. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 143-149.
Use of American skill and ingenuity in overcoming local problems such as training of unskilled personnel, climatic conditions, raw materials and distance from sources of supply. Photographs. (D1, B10)

313-D. Results of One Year's Researches on the Low-Shaft Furnace. I. *Henry Brutcher Translation No.* 3561, 21 p. (From *Revue Universelle des Mines,* v. 98, ser. 9, no. 2, 1955, p. 45-58.) Henry Brutcher, Altadena, Calif.
Previously abstracted from original. See item 163-D, 1955. (D1)

314-D. (Czech.) **Experiments in the Use of Oxygen in Converters in the Conversion of Bessemer Pig Iron.** Vladimir Chvatal. *Hutnik,* v. 5, no. 6, June 1955, p. 162-165.
Czech experiments in steelmaking. Comparison of strength of standard Bessemer steel, Bessemer steel with oxygen addition, and standard openhearth steel. Graphs, table. (D3, ST)

315-D. (Czech.) **Contribution to Pig Iron-Ore Process Technology.** Alex. Dekanovsky. *Hutnické Listy,* v. 10, no. 7, July 1955, p. 403-408.
Influence of temperature and

composition of liquid pig iron on the output of stationary and tilting openhearth furnaces. Tables, graphs. 8 ref. (D2, Fe)

316-D. (French.) **Combustion (Gas) Turbine. Characteristics and Results of Exploitation, Particularly in Metallurgical Works.** M. Widmer. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 8, 1955, p. 1593-1616.

Description of existing types. Utilization of gas from blast furnaces as fuel. Examples of applications. Tables, diagrams, graphs, photographs. (D1)

317-D. (French.) **Recent Progress in the Field of Gas Turbines Utilized in Steel Works.** M. Baumann. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques* v. 12, no. 8, 1955, p. 1617-1638; disc., p. 1638-1639.

Theoretical consideration, existing types, fields of application in metallurgy of steel. Graphs, diagrams. (D general)

318-D. (German.) **Results of the Investigation on Blast Furnace Hot Blast Stoves.** Karl Kessels. *Stahl und Eisen,* v. 75, no. 15, July 28, 1955, p. 958-974.

Conditions of the tests, heat balance and efficiency, heat load, heat transfer power, measuring equipment. Tables, graphs, diagrams. 10 ref. (D1)

319-D. Trends in German Silica Bricks for O.H.-Roofs. K. Konopicky. *Refractories Journal,* v. 31, Aug. 1955, p. 457-464; disc., p. 464-465.

Behavior and disentegration of bricks in actual service compared to chromatography. Graphs, tables. (D2, ST)

320-D. (German.) **Open-Hearth Steel Produced From Basic Bessemer Pig Iron Rich in Phosphorus.** Willy Oelsen and Heinz Voigt. *Stahl und Eisen,* v. 75, no. 16, Aug. 11, 1955, p. 1013-1024.

Comparison of pig iron and ore process with conventional basic bessemer process. Slag composition, particularly its content of phosphorus pentoxide soluble in citric acid. Tables, graphs, photograph, diagrams. 16 ref. (D2, D3, CI, ST)

321-D. (German.) **Desulfurization of Pig Iron in the Electric Smelting Furnace.** Borut Marincek. *Stahl und Eisen,* v. 75, no. 16, Aug. 11, 1955, p. 1024-1026.

Sulfur content is dependent on the basicity of the slag and on saturation of the pig iron with carbon. Tables, graphs. (D6, Fe)

322-D. (German.) **Experiences With Hot Blast Valves of a Simplified Type of Design.** Willi Dehne. *Stahl und Eisen,* v. 75, no. 16, Aug. 11, 1955, p. 1027-1029.

Behavior of the rammed refractory lining and advantages of the flangeless design. Diagram, photographs. 1 ref. (D general)

323-D. Charging Open Hearth Furnaces. R. Solt. *British Steelmaker,* v. 21, Sept. 1955, p. 294-297.

Constant flow of charge materials depends on capacity of supply system and handling plant. Diagrams, graphs. (D2)

324-D. Capacity Gains, Fuel Savings Push All-Basic Openhearth. *Iron Age,* v. 176, Sept. 22, 1955, p. 114-115.

Two steel producers will begin using all-basic openhearth furnaces early next year; 20% gains in steelmaking capacity, and 5% savings in fuel consumption reported. Photograph.(D2, ST)

325-D. Oxidation of Titanium From Liquid Steel Into Slag in Acid and Basic High-Frequency Furnaces Under Various Slags. P. Bardenheuer and W. A. Fischer. *Henry Brutcher Translation No.* 3462, 22 p. (From *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, 1954, p. 515-521.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 76-D, 1955. (D6, AY)

326-D. Reduction of Oxides of Iron With Graphite. V. I. Arkharov, V. N. Bogoslovskii, M. G. Zhuravleva and G. I. Chufarov. *Henry Brutcher Translation No.* 3570, 12 p. (Condensed from *Zhurnal Fizicheskoi Khimii,* v. 29, no. 2, 1955, p. 272-279). Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 195-D, 1955. (D8)

327-D. (Russian.) **Higher Heat of Low-Bessemer Steel.** P. Ia. Sorokin. *Liteino proizvodstvo,* 1955, no. 8, Aug., p. 23-25.

Chemical processes of the oxidizing blast in the converters and the role of slag-forming impurities; composition of the gases at various stages of the process; explanation for the use of a higher temperature than that required for the usual Bessemer steel. Tables, graph. 10 ref. (D3, ST)

328-D. (Russian.) **Tests of Refractories for the Checkered Brickwork of the Regenerators in Open-Hearth Furnaces.** E. A. Kogon. *Ogneupory,* v. 20, no. 5, 1955, p. 210-217.

Temperatures in furnace crown, at jets, and of exhaust gases, factors affecting brick life, use of chromium-magnesite brick, Dinas brick and other refractories, chemical compositions before and after service, breakdown rates compared. Tables, photographs. (D2)

329-D. (Russian.) **Behavior of Sulfur in Blast Furnace Melting and Methods of Lowering the Sulfur Content in Cast Iron.** V. G. Voskoboinikov *Stal',* v. 15, no. 7, July 1955, p. 583-591.

Determination of sulfur content in cast iron; losses through the furnace mouth and by other means; absorption of sulfur by lime, iron, and slags; desulfurizing cast irons by magnesium and by soda. Diagrams, graphs, table. 22 ref. (D1, Fe)

330-D. (Russian.) **Effect of the Crystallization Conditions of Steel on the Rejection of Ingots Due to Cracks.** V. A. Efimov, V. I. Danilin and M. P. Lapshova. *Stal',* v. 15, no. 7, July 1955, p. 601-606.

Cause of hot transverse cracks is the retardation of ingot shrinkage in the mold; shrinkage mechanics of various steels and space between ingot and different parts of the mold during solidification; effect of design and condition of molds. Diagrams, graphs, table. 7 ref. (D9, ST)

331-D. (Russian.) **Bottom Casting Without Pressure With a Pause During the Filling of the Hot-Top.** N. I. Shutkin. *Stal',* v. 15, no. 7, July 1955, p. 607-611.

New procedure for bottom casting of 500 kg. steel ingots; timing of hot-top filling decreases porosity, nonmetallic inclusions and inspection effort. Photographs, tables, diagrams. (D9, ST)

332-D. (Russian.) **Mixing of Metal and Slag in Open-Hearth Furnaces.** A. I. Osipov, L. A. Shvartsman, M. T. Bul'skii and A. G. Alimov. *Stal',* v. 15, no. 8, Aug. 1955, p. 709-713.

Use of radioactive indicators for studying processes in the bath of steelmaking furnaces to determine movement of liquid in relation to technological factors. Diagrams, tables, graphs. 4 ref. (D2, ST)

333-D. (Russian.) **Increasing the Stability of High-Percentage Ferrosilicon.** T. P. Khazanova and Iu. P. Vasin. *Stal',* v. 15, no. 8, Aug. 1955, p. 720-727.

To obtain a high-percentage ferrosilicon, pure charge materials must be used. For good stability, the rate of cooling is increased by teeming into molds for making ingots no thicker than 70 to 100 mm. Microstructure and effect of impurities discussed. Micrographs, graphs, tables, diagram. 6 ref. (D9, M27, Fe)

334-D. Pneumatic Steelmaking Processes. III. D. J. Carney. *Blast Furnace and Steel Plant,* v. 43, Sept. 1955, p. 1006-1010.

Major metallurgical and engineering factors in connection with side blowing. Additional heat is available from oxidation of carbon, making heat requirements from oxidation of silicon and phoshorus less critical. Low-nitrogen steels can be produced, thus improving ductility of steel, sulfur removal is more effective, low blast pressures allow lower-cost blowing equipment. Tables. 12 ref. (D3, ST)

335-D. Continuous Casting Installation for Stainless and Alloy Steels. *Engineer,* v. 200, Sept. 9, 1955, p. 383-384.

Experience with continuous casting process, automatic scarfing machine used on stainless steels, Sendzimir hot planetary mill and electrolytic salt descaling process used in annealing and pickling. Graph, diagrams. (D9, F21, F23, L12, SS, ST)

336-D. Steelmaking at Redbourn. S. R. Isaac. *Iron and Steel Institute, Journal,* v. 181, Sept. 1955, p. 44-49.

Survey of layout, equipment and operation of present melting shop with reference to all-basic open-hearth furnace and new desiliconizing plant. Tables. (D2, A5, ST)

337-D. Steel Manufacture. Walter Mathesius. *Metal Progress,* v. 68, Sept. 1955, p. 77-81.

Review of three major steel-producing methods, with a look into a future when a widely decentralized steel industry may refine metal by the newer pneumatic processes and cast it continuously into extrusion billets or slabs for single mill stands. Photographs. (D general, ST)

338-D. Desiliconizing in Basic Open-hearth Furnaces. (Digest of "Desiliconized Hot Metal in Basic Open-hearth Furnace", by L. M. Billimoria, T. V. S. Ratnam and S. N. Anant Narayan; *Technical Journal* of the Tata Iron and Steel Co., v. 2, Jan. 1955.) *Metal Progress,* v. 68, Sept. 1955, p. 173 + 4 pages.

Desiliconization of blast furnace

hot metal carried out and controlled in a stationary basic openhearth furnace with help of oxygen. Success of experiments is due to the normal bath depth of about 30 in. of the furnace used for desiliconization. (D2)

339-D. Results of One Year's Researches on the Low-Shaft Furnace. II. *Henry Brutcher Translation No.* 3562, 17 p. (From *Revue universelle des Mines,* v. 11, ser. 9, no. 2, 1955, p. 58-65.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 163-D, 1955, (D8, D1)

340-D. (Czech.) **Experience in the Production of Heavy Ingots.** Oldrich Bohus. *Hutnické listy,* v. 10, no. 8, Aug. 1955, p. 456-461.

Regulation of casting schedules for large ingots (100 to 130 tons) shows an optimum procedure which yields improved steel. Graph, diagrams, tables, photographs. (D9, ST)

341-D. (French.) **Technical Development and Progress in the Conception and Construction of Cowpers.** Schoendoerffer. *Centre de Documentation Sidérurgique, Circulaire d'Information Techniques,* v. 12, no. 9, 1955, p. 1753-1771.

Critical examination of improvements in the construction and operation of Cowpers made in recent years from practical, theoretical and heating points of view. Diagrams, photographs, graphs. 6 ref. (D1)

342-D. (French.) **Application of the Prerefining of Basic Bessemer Pig Iron.** Bauer. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 9, 1955, p. 1773-1785.

Results obtained in industrial prerefining of low-sulfur basic bessemer pig using a pure-oxygen blast. Comparison of prerefined and nonprerefined pigs. Photographs, graphs, tables. (D3)

343-D. (French.) **Use of Histograms for the Study of the Behavior of Converter Bottoms.** Delong. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 9, 1955, p. 1787-1799.

Histographic study of life of converter bottoms, methods of production and variations between factories at 18 French steel mills over a 12-month period. Histograms, tables. (D3, ST)

344-D. (German.) **Noise Measurement as Control and Observation Means in Air Blowing Purification Progress.** J. Klärding. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 780-783.

Experience in control of air blowing in steel manufacturing by noise measurement and its relation to different stages of the process. Graphs, tables, curves. 3 ref. (D3, ST)

345-D. (German.) **The Arrangement of an Air-Cooling System in the Hearth Block of Furnaces.** Joachim Tischendorf. *Metallurgie,* v. 5, no. 4, Apr. 1955, p. 132-134.

Lowers temperature in concrete and removes temperature differences where carbon stones are used for setting on furnace foundations. Graphs. diagrams. (D1)

346-D. (German.) **Popular Exposition of Metallurgical Processes in the Basic Open-Hearth Process.** Stefan Kronmarck. *Metallurgie,* v. 5, no. 8, Aug. 1955, p. 250-252.

Purpose is to promote knowledge of melters and foremen. Diagram, graphs. (D2)

347-D. Problems of Casting-Pit Refractories. Louise Halm. *British Ceramic Society, Transactions,* v. 54, Sept. 1955, p. 507-537; disc., p. 537-542.

Slag and steel attack on ladle bricks, sleeves, stoppers and nozzles, and bottom-casting refractories. Tables, graphs, photographs. 38 ref. (D9, ST)

348-D. Basic Checkers Proved Economical on Replacement Comparison With Clay. C. C. Benton. *Journal of Metals,* v. 7, Oct. 1955, p. 1088-1089.

Used by Algoma Steel Corp. to increase firing rates for higher productivity per operating hour. Photographs, table. (D2, ST)

349-D. Oxidation of Phosphorus and Manganese During and After Flushing in the Basic Open Hearth. John F. Elliott and Frank W. Luerssen. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Oct. 1955, p. 1129-1136.

Data indicate that phosphorus and manganese distributions between slag and metal closely approach equilibrium toward end of and just after the flush. Tables, graphs. 10 ref. (D2, Fe, Mn, P)

350-D. (French.) **Simultaneous Desulfurization and Deoxidation in the Basic Converter.** Francis Meunier and Camille Soisson. *Revue de métallurgie,* v. 52, no. 8, Aug. 1955, p. 589-594; disc., p. 594-595.

Simultaneous reaction governed by physico-chemical equilibrium reaction between sulfur and oxygen in

solution in metal and between sulfur and oxygen ions in slags. Graphs, tables. 11 ref. (D3, P12, ST)

351-D. (German.) **The Attack of Pig-Iron and Slag on Carbon Stones for Furnaces.** Wolfgang Küntscher and Joachim Holzhey. *Metallurgie,* v. 5, no. 4, Apr. 1955, p. 128-132.
Strong carbon absorption takes place for pig-iron containing much manganate; good cooling is essential. Graphs, tables, micrographs, photographs. 4 ref.
(D2, D1, B19, Mn, C, CI)

352-D. (German.) **Application of Sound and Ultrasonics in Metallurgy.** Hans Mathiske. *Metallurgie,* v. 5, no. 5, May 1955, p. 165-169.
Quality improvement of metal melts, blast furnace gas cleaning, waste gas dedusting of Siemens-Martin furnaces. Micrographs, diagrams, table. 11 ref. (D1, D2, A8)

353-D. (German.) **Slag Working in Steel Production.** Wolfgang Küntscher. *Metallurgie,* v. 5, no. 8, Aug. 1955, p. 241-245.
Reasons for good slag regulation in producing high-grade steel. Graphs, diagrams, photograph. 21 ref. (D general, ST)

354-D. (Polish.) **Crisis of the Previous Theories of the Blast Furnace Process.** Wladyslaw Kuczewski. *Hutnik,* v. 22, nos. 7-8, July-Aug. 1955, p. 228-237.
Contemporary theory of the reduction of metal oxides. Chemical reactions in the reduction process, Bell reaction, other phases of blast furnace processes. Diagram, graph, table. (D1, Fe)

355-D. (Polish.) **Primary and Secondary Phenomena in the Blast-Furnace Process.** Wladyslaw Kuczewski. *Hutnik,* v. 22, nos. 7-8, July-Aug. 1955, p. 237-240.
Relation between chemical, thermal and mechanical phenomena in metallurgical processes. Graphs.
(D1, Fe)

356-D. (Polish.) **Evaluation and Interpretation of the Methods for Determining the Mechanical Stability of Coke and Its Reactivity.** Andrzej Grossman. *Hutnik,* v. 22, nos. 7-8, July-Aug. 1955, p. 240-246.
Relation of carboxy-reactivity of coke to temperature; other thermal-chemical relations. Graphs, tables. 12 ref. (D1, B18)

357-D. (Polish.) **Melting and Casting of Steels in Vacuum.** H. Zakowa. *Hutnik,* v. 22, nos. 7-8, July-Aug. 1955; *Biuletyn informacyjny, Instytutow ministerstwa hutnictwa,* v. 6, nos. 7-8, 1955, p. 29-32.
Design and use of vacuum furnaces, melting and casting techniques, composition and quality of castings obtained. Diagrams, photograph, micrographs. (D8, ST)

358-D. (Russian.) **Hydrogen in the Metal in the Course of Acid Open-hearth Melting.** M. M. Karnaukhov and A. K. Urazgil'deev. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 8, Aug., p. 93-99.
Variation of composition and temperature of the metal and slag during melting process; presence of hydrogen before and after deoxidizing and alloying additions; effect of furnace and melting conditions. Graphs, table. 2 ref. (D2, ST)

359-D. **The Oxygen Steelmaking Process.** D. O. Davis. *Iron and Steel Engineer,* v. 32, Oct. 1955, p. 90-96.
Provides additional good quality steelmaking capacity at lower capital and operating costs. Diagrams, photographs, graph. (D general, ST)

360-D. **The Reaction of Carbon and Oxygen in Molten Iron.** E. T. Turkdogan, L. S. Davis, L. E. Leake and C. G. Stevens. *Iron and Steel Institute, Journal,* v. 181, Oct. 1955, p. 123-128.
Study used furnace atmosphere of carbon monoxide at one atmosphere pressure at 1540 and 1640° C. and at carbon concentrations up to 3.6%. Graphs. 20 ref. (D2, P12, Fe)

361-D. **The Relative Merits of Low and High-Sulphur Oil for Open-Hearth Steelmaking.** C. A. Edwards. *Iron and Steel Institute, Journal,* v. 181, Oct. 1955, p. 138-147.
Observation of the varying degrees of sulfur pickup when using fuels containing different percentages of sulfur, and a calculation of these effects on the weight and character of slag required for production of steel of different sulfur contents. Tables, graphs. 8 ref. (D2, ST)

362-D. (Russian.) **Forsterite Brick Service in Open-Hearth Furnace.** A. V. Leskov, G. A. Molotkov, A. L. Turubiner and T. I. Litvinova. *Ogneupory,* v. 20, no. 6, 1955, p. 243-254.
Chemical composition of brick before and after service in regenerators; microstructure of brick surface and lower zones; composition of burning gases; factors affecting brick life. Tables, micrographs, photographs, diagrams, graphs (D2)

363-D. **Pneumatic Steelmaking Processes. IV.** D. J. Carney. *Blast Furnace and Steel Plant,* v. 43, Oct. 1955, p. 1139-1141.

Basic top blown process uses high purity oxygen lance for blowing pig iron. Diagrams, graph. 1 ref. (D3, ST)

364-D. Melting Process Offers Higher Quality Superalloys. W. W. Dvrkacz. *Iron Age,* v. 176, Oct. 27, 1955, p. 75-77.

Results obtained by arc melting under vacuum using consumable electrodes include ingots up to 2000 lb., improved metal cleanliness, lower gas content and close control of solidification rates. Photographs, table. (D8, D5, SG-h)

365-D. Elimination of Carbon in the Open Hearth Furnace. I. Pierre Vallet. *Iron & Steel,* v. 28, Oct. 1955, p. 463-467.

Compilation of experimental data and various ideas concerning mechanism of decarburization. Diagrams, graphs. 8 ref. (To be continued.) (D2, ST)

366-D. Air Purging Stops Metal Porosity. Adam J. Texter. *Steel,* v. 137, Oct. 31, 1955, p. 72, 74.

Method and apparatus for drying regular plant compressed air for flushing the bath. Photograph. (D9, ST, SS, TS)

367-D. Smelting Iron Ore With Anthracite: Bureau of Mines Experimental Blast Furnace. R. C. Buehl and M. B. Royer. *U. S. Bureau of Mines, Report of Investigations* 5165, Aug. 1955, 15 p.

Furnace of 3-ft. diam. hearth, producing 12 tons of metal per day, was operated 2 weeks with various proportions of anthracite replacing coke. Diagram, tables, graphs. 9 ref. (D1, Fe)

368-D. Cleaning of Open Hearth Stack Gases. Leslie Silverman. *Year Book* of American Iron and Steel Institute. p. 267-296.

Scope and magnitude of the gas cleaning problem, developments undertaken to solve problem economically. Tables, micrographs, diagrams, photographs, graph. 5 ref. (D2, A8, ST)

369-D. (Czech.) **Design of Blast-Furnaces With Thin-Walled Shafts.** Svatopluk Cernoch. *Hutnické listy,* v. 10, no. 9, Sept. 1955, p. 513-520.

Experience has shown reduced coke consumption, also lower investment and maintenance costs result from this type of construction. Diagrams. (D1, Fe)

370-D. (German.) **Observations Made Through the Bottom Tuyeres of a Blowing Steel Converter. Effect of Locally High Temperatures on the Chemical Processes.** Gerhard Naeser, Werner Pepperhoff and Helmut Riedel. *Stahl und Eisen,* v. 75, no. 19, Sept. 22, 1955, p. 1244-1251.

Color pyrometer measurements and other examinations show effect of temperatures on nitrogen absorption of heat. Diagrams, graphs, photographs, micrographs, tables. 3 ref. (D3, ST)

371-D. (German.) **Dolomite as a Refractory Material for the Basic Air Refining Process.** Walter Bading. *Stahl und Eisen,* v. 75, no. 20, Oct. 6, 1955, p. 1300-1310.

Considers all phases of preparation, from assaying deposit through sintering to installation of brick. Tables, graphs, micrographs, diagrams, photographs. 17 ref. (D3, B19, ST)

372-D. (German.) **Burning of Converter Bottoms.** Heinz Wübbenhorst. *Stahl und Eisen,* v. 75, no. 20, Oct. 6, 1955, p. 1310-1317.

Charging ratios, burning curves, gas consumption, importance of tar for heat consumption, roof and bottom core temperatures, furnace atmospheres. Graphs, tables, photographs, diagrams. 11 ref. (D3, ST)

373-D. (Book.) **Year Book of American Iron and Steel Institute,** 426 p. 1955. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.

Fourteen papers covering the steel industry—its progress and expansion, operating problems, product development, public and industrial relations, and the Ninth Schwab Memorial Lecture. (D general, A4, A5, ST)

SECTION E

FOUNDRY

1-E. Frozen Mercury Method Permits Larger Precision Castings. *Industrial Heating,* v. 21, Oct. 1954, p. 2010, 2012.

New medium for extending industrial design possibilities; increases abilities of foundries to handle larger, complex castings with close tolerance requirements. Diagrams, photograph. (E15)

2-E. (German.) **Cooling and Dedusting Molding Sand.** W. Gesell. *Giesserei,* v. 41, no. 21, Oct. 14, 1954, p. 578-583.

Discussion of and practical suggestions on recovery of used molding sand by dry and wet methods of cooling and dust removing. Diagrams, table, graphs. 10 ref. (E18)

3-E. (Hungarian.) **Hungarian and Foreign Experiences in the Field of Producing Cylinder Bushings by Centrifugal Casting.** Tibor Budinszky and Jozsef Gerédi. *Ontöde,* v. 5, no. 6, June 1954, p. 122-128.

Studies using water-cooled iron molds. Causes of defects. Diagrams, photographs. (E14)

4-E. How Coke Size—Screening—Handling Affect Cupola Melting. Woodrow W. Holden. *American Foundryman,* v. 26, Nov. 1954, p. 38-40.

Proper techniques save coke, increase melting rate and promote maximum temperature. Photographs, graph, tables. (E10)

5-E. System Sand Control. Morris Gittleman. *American Foundryman,* v. 26, Nov. 1954, p. 54-58.

Compromise between sand properties, equipment and economy for efficient operation. Photographs, table. (E18)

6-E. Intricate Investment Castings Require Shop "Savvy". John P. Wright. *American Machinist,* v. 98, Nov. 22, 1954, p. 120-125.

Guide for small jobbing shop practice. Photographs, diagrams. (E15)

7-E. Simplification for Foundry Efficiency. J. Hunter. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Oct. 1954, p. 416-440.

Significance of statistical data from 240 foundries concerning output in relation to size of foundry, costs, output per operator, personnel and output in terms of production method. Tables, graphs. (E general)

8-E. Suggestions for Simplification in Foundry Operations. A. A. Timmins. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Oct. 1954, p. 441-446.

Suggestions for minor improvement in pattern equipment, melting, molding coremaking and fettling. (E general)

9-E. Gray Iron Casting With Exothermic Feeding. V. Grice. *Canadian Metals,* v. 12, Nov. 1954, p. 34, 36, 38-40.

Exothermic technique compensates for natural heat losses giving higher quality and greater economy. Diagrams. (To be continued.) (E23, CI)

10-E. Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 33, Nov. 1954, p. 254-255.

After an elementary review of blast furnace practice, describes crucible and hearth melting furnaces. Diagrams. (To be continued.) (E10, D1)

11-E. Tame Bridge Foundry: Short Runs of Heavy and Lightweight Castings. *Engineering,* v. 178, Oct. 15, 1954, p. 505-507.

Plant site and buildings, raw material handling, molding methods, shake-out and sand plant and core

making facilities. Photographs. (E general)

12-E. Automation Unit Performs All Operations in Casting of Small Parts. L. F. Miller. *Iron Age,* v. 174, Nov. 4, 1954, p. 128-130.

Integration of 12 operations permits production of up to 300 multiple cavity molds per hr. Diagram, photographs. (E19)

13-E. Casting Quality, Ease of Mechanization Key Shell Mold Advantages. I-II. W. F. Bye. *Iron Age,* v. 174, Nov. 18, 1954, p. 147-150; Nov. 25, 1954, p. 98-101.

New automatic and semi-automatic equipment. Production techniques. Photographs, tables. (E16)

14-E. The British Steel Castings Research Association. J. F. B. Jackson. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 183-186, 191.

Research and development projects of current interest. Diagrams, photographs, micrographs. (E general, A9, CI)

15-E. Precision Controls in Foundry Produce Uniform Quality Meehanite Castings. James Barr. *Western Metals,* v. 12, Nov. 1954, p. 52-54.

Production of high-quality, limited volume castings. Photographs, tables, micrographs. (E11, CI)

16-E. (French.) **Influence of Mineral Black, Pitch, and Sawdust in Green and Stoved Molding Sands.** Pierre Nicolas. *Fonderie,* 1954, no. 105, Oct. p. 4163-4174.

Includes graphs, tables. (E18)

17-E. (French.) **Solidification and Dimensions for Risers. Verification Test and Application of a Theory.** Georges Berger and André Belin. *Fonderie,* 1954, no. 105, Oct., p. 4175-4186.

Theory to determine relation between solidification time and dimensions of cast pieces. Experimental data. Photographs, charts, tables. 6 ref. (E22, E25)

18-E. (German.) **Cast Crank Shafts for Vehicle Construction.** Wolfgang Kilian. *Metallurgie und Giessereitechnik,* v. 4, no. 9, Sept. 1954, p. 401-406.

Designs, technique of molding and casting and results of strength tests. Tables, graph, photographs, diagrams. 4 ref. (E general, Q23, CI)

19-E. (Russian.) **Shrinkage Heads With Internal Gas Pressure for Aluminum-Alloy Castings.** L. M. Cherkasov, G. A. Kaplunovskii, I. I. Pavlenko and A. P. Lubenets. *Liteinoe Proizvodstvo,* 1954, no. 5, Aug., p. 1-3.

Utilization of different pressure-producing charges and their influence on the quality of aluminum castings. Table. graph, photograph. 5 ref. (E25, Al)

20-E. (Russian.) **Elimination of Surface Defects of Pressure Castings by Means of Regulating the Heat Balance of the Mold.** V. M. Pliatskii. *Liteinoe Proizvodstvo,* 1954, no. 7, Oct., p. 3-6.

Experimental investigation of causes of defects and methods of prevention. Tables, diagrams. (E25)

21-E. (Russian.) **Oscillographic Method of Measuring the Rate of Metal Travel in Casting Mold.** T. I. Orlova. *Liteinoe Proizvodstvo,* 1954, no. 7, Oct., p. 25-27.

Basic principles of method, techniques of application. Graphs, tables, diagrams. (E19)

22-E. (Swedish.) **Defects in Castings and Their Causes. V.** Holger Pettersson, G. Fernheden and G. Lindh. *Gjuteriet,* v. 44, no. 9, Sept. 1954, p. 149-156.

Primary causes of scabs, rat-tails, buckles, sandholes, kishes, bums, and parting line seams, and the relations between them. Diagrams, photographs. (E general)

23-E. (Swedish.) **Standard Methods of Testing Foundry Sands.** *Gjuteriet,* v. 44, no. 9, Sept. 1954, p. 157-160.

Revision of 1948 Swedish standards include methods for core sands and binders. Diagrams, photographs. (E18)

24-E. A Practical Method for Vacuum Degassing of Nonferrous Metals. Harold F. Bishop, Edward E. Layne and William S. Pellini. *Foundry,* v. 82, Dec. 1954, p. 78 + 8 pages.

Practical, commercial-type pumps combined with proper risering and gating can produce pressure tight castings. Photographs, micrographs, diagrams. (E22)

25-E. Eliminating Defects in Die Castings. W. M. Halliday. *Foundry,* v. 82, Dec. 1954, p. 84 + 10 pages.

Causes and remedies of parting-line flash, flow marks and porosity. Photographs. (E13)

26-E. Closed-Top Cupolas End Air Contamination. Robert H. Herrmann. *Foundry,* v. 82, Dec. 1954, p. 86-89.

Experience at Ford foundry shows high operating efficiency and almost complete elimination of atmospheric contamination. Drawings, photographs. (E10, A8)

27-E. Modern Methods Employed in Berliet Foundries of France. Vincent Delport. *Foundry,* v. 82, Dec. 1954, p. 90-93, 242.

Equipment, plant layout and techniques for production of heavy castings. Photographs. (E general, A5, CI, Cu, Al)

28-E. **Some Properties of Phenolic Resin Core Binders.** Carl E. Schubert. *Foundry,* v. 82, Dec. 1954, p. 100-101, 248-251.

Tests on cores baked for various times at 350, 400 and 450° F. Graphs. (E18, E21)

29-E. **Centrifugal Casting of Sleeve Bearings.** J. B. Mohler. *Foundry,* v. 82, Dec. 1954, p. 102-105.

Types of castings and conditions where the process is economical. Diagrams, photographs. 6 ref. (E14)

30-E. **Physicochemical Considerations Regarding the Operation of Acid and Basic Cupolas.** H. Schmidt. *Henry Brutcher, Altadena, Calif., Translation no.* 3011, 21 p. (From *Giesserei, Technisch-Wissenschaftliche Beihefte,* 1952, nos. 6-8, p. 273-279.)

Cupola reactions involving sulfur, calcium carbide and phosphorus. Graphs, tables. 8 ref. (E10, CI)

31-E. **Use of Oxygen in the Melting of Low-Carbon Superheated Cast Iron (Malleable).** V. A. Fuklev. *Henry Brutcher, Altadena, Calif., Translation no.* 3364, 11 p. (From *Liteinoe Proizvodstvo,* v. 5, no. 2, 1954, p. 1-3.)

Previously abstracted from original. See item 425-E, 1954. (E10, CI)

32-E. **Melting of Unbriquetted Fine Metal Scrap in the Cupola.** Yu. S. Sukharchuk and M. P. Nikolaichik. *Henry Brutcher, Altadena, Calif., Translation no.* 3384, 9 p. (From *Liteinoe Proizvodstvo,* v. 5, no. 1, 1954, p. 30-31.)

Previously abstracted from original. See item 184-E, 1954. (E10, CI, ST)

33-E. **Ways of Intensifying the Combustion in the Cupola.** L. M. Marienbakh and Yu. S. Sukharchuk. *Henry Brutcher, Altadena, Calif., Translation no.* 3395, 14 p. (From *Liteinoe Proizvodstvo,* v. 3, no. 2, 1952, p. 15-17.)

Study of ways and means of increasing quantity of heat contained in the cupola gases. 13 ref. (E10)

34-E. (Pamphlet.) **Research on Shell Moldings. Massachusetts Institute of Technology.** Report no. PB 111401. 54 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $2.00.

Coarse or rounded sand grains require less resin. Excess resin may be detrimental to surface finish. (E16)

35-E. **Automation in Core Making.** C. W. Hockman. *American Foundryman,* v. 26, Dec. 1954, p. 36-40.

Experience with automatic, five-station, rotary core blowing machines. Photographs, diagram. (E21)

36-E. **Holding Blast Humidity Constant.** Joseph L. Brooks. *American Foundryman,* v. 26, Dec. 1954, p. 41-43.

Effects of cupola blast humidity on melt properties, control techniques. Graph, micrographs, diagram, photograph. 5 ref. (E10, CI)

37-E. **Smog Control in the Foundry.** Harry Dok. *American Foundryman,* v. 26, Dec. 1954, p. 46-49.

Collection of smoke, fumes and dust in an electric steel foundry. Photographs, diagram. (E general, A8, CI)

38-E. **What Is Silica Sand?** Clyde A. Sanders and O. Jay Myers. *American Foundryman,* v. 26, Dec. 1954, p. 56-59.

Definitions of terms used in foundry technology. Micrographs, photographs, diagram. 20 ref. (E18)

39-E. **How to Prevent Copper-Base Alloy Casting Defects.** *American Foundryman,* v. 26, Dec. 1954, p. 61-63.

Various defects and how to eliminate them. Photograph. (E25, Cu)

40-E. **Electric Furnace Melting Practices Compared for High Alloy Steel Production.** P. R. Gouwens. *Journal of Metals,* v. 6, Dec. 1954, p. 1372-1375.

Comparison of acid dead melting, acid oxygen and basic oxygen practices for stainless steel castings. Tables, photograph, graph. 6 ref. (E10, SS, CI)

41-E. **Titanium Melting and Casting.** D. I. Sinizer. *Precision Metal Molding,* v. 12, Dec. 1954, p. 36-37, 83.

Investment casting techniques for titanium and its alloys. Photographs. (E15, Ti)

42-E. **The Die Casting Process.** *Precision Metal Molding,* v. 12, Dec. 1954, p. 50-55.

Process, advantages, metals that can be used, costs and applications. (E13)

43-E. **Seal-Protect-Enhance With One Coating.** E. J. Solski. *Precision Metal Molding,* v. 12, Dec. 1954, p. 59-61.

Vinyl plastic found to be highly satisfactory for zinc alloys with low copper content. Photographs. (E25, Zn)

44-E. **What Can You Do About Flaws?** T. E. Eagan. *Steel,* v. 135, Dec. 6, 1954, p. 158-159, 162.

Detection, evaluation and repair of defects in iron or steel castings; residual stresses and stress-relief. Photograph, diagram, table. (E25, Q25, CI)

45-E. "Booking" Technique Extends Application of Frozen Mercury Process. *Tooling and Production,* v. 20, Dec. 1954, p. 96.
Utilization of fact that frozen mercury joins with slight pressure. (E15)

46-E. (French.) **Desiliconizing and Desulfurizing Cast Irons by Means of a Single Slag.** René Perrin. *Comptes rendus,* v. 239, no. 17, Oct. 27, 1954, p. 1042-1043.
Composition and techniques required. (E25, CI)

47-E. (German.) **Predetermining the Gas Permeability of Core Sands by the Volume Number.** Horst-Werner Wenig. *Giesserei,* v. 41, no. 22, Oct. 28, 1954, p. 593-595.
Rapid experimental determination using ratio of absolute volume to apparent volume. Graphs, diagrams, table. 5 ref. (E18)

48-E. (German.) **Correct Selection of Line Frequency Crucible Furnaces for the Gray-Iron Foundry.** Karl Heinz Brokmeier. *Giesserei,* v. 41, no. 22, Oct. 28, 1954, p. 595-598.
Suggestions from standpoint of efficiency and economy. Graphs. (E10, CI)

49-E. (German.) **The Practical Core-Box Lock.** W. Hagedorn. *Giesserei,* v. 41, no. 22, Oct. 28, 1954, p. 602-603.
Different types of breech discussed. Diagrams. (E21)

50-E. (German.) **Technique of Molding in the Iron Foundry.** Gustav Vedder. *Giesserei,* v. 41, no. 23, Nov. 11, 1954, p. 628-631.
Production of molds, gating technique, pouring basins to retain slag, risers, green and dry-sand casting, cement-sand casting, dies and chill molds. Diagrams. (E19, E22, E23, CI)

51-E. (German.) **Gas and Oxide Contents of Cupola Melted Iron Castings and the Influence of Charged Materials.** Peter Bardenheuer and Peter von der Forst. *Stahl und Eisen,* v. 74, no. 24, Nov. 18, 1954, p. 1577-1582.
Defects caused by gases; effects of various oxides in the melt on the manganese-sulfur ratio; influence of solidification range on defects. Tables, graphs. 4 ref. (E10, E25, CI)

52-E. (Portuguese.) **Casting of Corrosion Resistant, High-Silicon Cast Iron Pieces.** Lino Afonso de Lacerda Santos. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 34, Jan. 1954, p. 33-42.
Properties and characteristics of iron with silicon between 13 and 17%. Photographs, micrographs. 3 ref. (E general, CI, Si)

53-E. Gray Iron Casting With Exothermic Feeding. II. V. Grice. *Canadian Metals,* v. 17, Dec. 1954, p. 30, 32.
Substantial savings can be obtained where large volumes of metal are to be fed. Photographs, diagrams. (E23, CI)

54-E. Growing Competence in High Pressure Molding. W. R. Adams. *Canadian Metals,* v. 17, Dec. 1954, p. 34, 36, 38.
Latest developments applicable to large and small foundries. Diagrams. (E19)

55-E. Aspects of Metallurgical Control in the Modern Steel Foundry. N. Y. Newton. *Foundry Trade Journal,* v. 97, Nov. 25, 1954, p. 625-630.
Factors influencing quality of alloy steel castings and their control. Diagrams, photographs, table. (E25, CI)

56-E. Modern Manufacture and Use of Cast Rolling Mill Rolls. F. H. Allison, Jr., and C. E. Peterson. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 68-76; disc., p. 76-77.
Foundry procedures and advantages of cast iron and cast steel rolls. Diagrams, photographs, micrographs, tables, graphs. 2 ref. (E general, F23, CI)

57-E. (Czech.) **Use of Insulated Risers for Steel Castings.** Vitezslav Batek, Antonin Straka and Jaroslav Kracik. *Slévarenstvi,* v. 2, no. 9, Sept. 1954, p. 267-270.
Advantages of flue dust in form of sleeves or powder over charcoal as insulating material. Diagrams, photographs. (E22, CI)

58-E. (Czech.) **Analysis and Control of Foundry Operations Using Statistical Methods.** A. Zaludova. *Slévarenstvi,* v. 2, no. 10, Oct. 1954, p. 289-292.
Efficiency and operational value of technical control. Graph. 8 ref. (E25, S12)

59-E. (Czech.) **Oxygen Enriched Blast for Cupolas.** Miroslav Vilgus and Vlastislav Otahal. *Slévarenstvi,* v. 2, no. 10, Oct. 1954, p. 292-296.
Efficiency of various degrees of enrichment; equipment and techniques. Diagrams, tables, graphs. 3 ref. (E10)

60-E. (Czech.) **Some Examples of Risering Steel Castings.** Houst' and Rostislav Slovacek. *Slévarenstvi,* v. 2, no. 10, Oct. 1954, p. 296-301.
Advantages of blind atmospheric and insulated risers. Tables, diagrams, photographs, graph. 7 ref. (E22, CI)

61-E. (Czech.) **Production of Austenitic Manganese Steel Castings.** Karel

Weber. *Slévarenstvi,* v. 2, no. 10, Oct. 1954, p. 301-305.
Casting characteristics, structures, mechanical properties and casting techniques. Table, micrographs, graphs, diagrams. 5 ref. (E general, Q general, CI)

62-E. (French.) **Possibilities of the Microfoundry in the Field of Miniaturizing in Radio-Electricity.** Pierre Lefranc. *Métaux, Corrosion-Industries,* v. 29, no. 350, Oct. 1954, p. 380-384.
Lost-wax casting of miniature pieces. Photograph. (E15)

63-E. (German.) **The Riser-Gating Process; A Contribution to the Reduction of Scrap in Gray-Iron Foundries.** Walter Ballhause. *Metallurgie und Giessereitechnik,* v. 4, no. 10, Oct. 1954, p. 439-445.
Principles and techniques for efficient foundry practice. Diagrams, tables, photographs. 2 ref. (E22, CI)

64-E. (Hungarian.) **Conditions for the Production of Nodular Cast Iron.** Miklos Cseh. *Ontöde,* v. 5, no. 11, Nov. 1954, p. 241-251.
Manufacturing processes of machine parts and other applications. Composition, heat treatment, mechanical properties. Diagrams, tables, graphs. (To be continued.) (E general, Q general, CI)

65-E. (Hungarian.) **Conditions for Production of Nodular Cast Iron. II.** Miklos Cseh. *Ontöde,* v. 5, no. 12, Dec. 1954, p. 265-270.
Casting properties, molding, use of iron silicide instead of calcium silicide; addition of magnesium oxide. Tables, graphs. 59 ref. (E25, Q general, CI)

66-E. (Hungarian.) **Design and Application of Risers of Steel Castings.** Jozsef Ferenczi. *Ontöde,* v. 5, no. 12, Dec. 1954, p. 282-285.
Problems of cylindrical and spherical risers. Diagrams, tables. 1 ref. (E22, CI)

67-E. (Swedish.) **Feeding and Solidification.** K. Åkesson. *Gjuteriet,* v. 44, no. 10, Oct. 1954, p. 170-179.
Thermal properties of molding materials and cast metals. Methods of determining rate and time of solidification. Graphs, tables, diagrams. 17 ref. (E23, E25)

68-E. **Malleable Gating.** Lawrence Winings. *American Foundryman,* v. 27, Jan. 1955, p. 35-40.
Influence of casting design on gating practice. Photographs. (E22, CI)

69-E. **Melting and Pouring Bronze.** A. E. Cartwright. *American Foundryman,* v. 27, Jan. 1955, p. 50-56.
Techniques and practices that have been proven by experience. Photographs. (E10, E23, Cu)

70-E. **What High-Temperature Tests Tell About Core Knockout.** Victor M. Rowell. *American Foundryman,* v. 27, Jan. 1955, p. 57-59.
Resume of report by A.F.S. Committee on Physical Properties of Iron Foundry Molding Materials at Elevated Temperatures. Photograph, tables. (E21)

71-E. **Castings Versus Weldments.** H. Mottram. *Foundry Trade Journal,* v. 97, Dec. 9, 1954, p. 687-697.
Comparison of properties, availability and production costs favors weldments in many cases. Castings are favored for large lots, heavy sections and special materials. Diagrams. (E general, K general)

72-E. **Shell Molding Is Easier.** Ray Olson. *Foundry,* v. 83, Jan. 1955, p. 76-79, 148, 150.
New equipment and techniques make the process easier and less expensive. Photographs. (E16)

73-E. **Front-Slagging Cupolas.** W. W. Levi. *Foundry,* v. 83, Jan. 1955, p. 80-83.
Advantages and construction of furnace. Diagram, photographs. (E10)

74-E. **Aluminum Sand Foundry Practice.** W. D. Stewart. *Foundry,* v. 83, Jan. 1955, p. 88-91, 216-220, 222.
Fundamentals of aluminum foundry practice. Photographs. (E18, Al)

75-E. **Hot Blast Systems.** Garnet P. Phillips. *Foundry,* v. 83, Jan. 1955, p. 92 + 10 pages.
Various cupola preheating systems used in common practice. Diagrams. (E10)

76-E. **Molding System Is Highly Automated.** Robert H. Herrmann. *Foundry,* v. 83, Jan. 1955, p. 110, 113, 116, 118.
Closed circuit system in which green sand molds are made, closed, shaken out, and the flasks separated and returned continuously. Diagram, photographs. (E19)

77-E. **Hot Chamber Magnesium Die Casting.** F. C. Bennett. *Light Metal Age,* v. 11, Dec. 1954, p. 22-24.
Construction and operation of successful machine. Photographs. (E13, Mg)

78-E. (Czech.) **Effect of Heat on the Durabilty of Die Casting Dies.** Jiri Cervasek. *Slévarenstvi,* v. 2, no. 8, Aug. 1954, p. 240-244.
Causes and elimination of thermal fatigue failures by surface treatment, particularly by nitriding. Diagrams. 1 ref. (E13, J28, TS)

79-E. (German.) **Precision Casting and Its Application.** Th. Klingenstein. *Metall,* v. 8, nos. 23-24, Dec. 1954, p. 915-922.

Comparative discussion of the Croning, gypsum, Shaw and lost-wax processes. Special advantages of the latter. Photographs, diagrams, tables. 8 ref. (E15)

80-E. (Book.) **Foundry Manual for Sand Casting Aluminum-10 Per Cent Magnesium Alloy.** Battelle Memorial Institute. 118 p. 1954. Frankford Arsenal, Philadelphia 37, Pa.

Techniques and precautions for producing sound castings. 34 ref. (E11, Al)

81-E. **Measurement of the Moisture Content of Sand.** R. G. Godding. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Dec. 1954, p. 473-480 + 2 plates.

Apparatus and its limitations. Diagram, tables, photographs, graphs. 1 ref. (E18)

82-E. **Shell Moulding Materials: Their Testing and Properties.** D. A. Taylor. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Dec. 1954, p. 502-516 + 4 plates.

Test equipment can show effects of curing temperature, time, resin and clay content and properties of molding sands. Diagrams, photographs, tables, graphs, micrographs. (E16)

83-E. **The Shell Moulding Process.** W. A. Campbell. *Engineering Journal,* v. 37, Dec. 1954, p. 1610-1612.

Mechanics and advantages of the process. Photographs. (E16)

84-E. **Mathematically-Designed Runner System to Eliminate Turbulence in Casting Cavity.** J. Aston. *Foundry Trade Journal,* v. 97, Dec. 30, 1954, p. 769-770.

Effects of size gradations in runners on rate of metal flow into the mold. Diagrams. (E19)

85-E. **Practical Method of Calculation of Riser Sizes.** B. Millington. *Foundry Trade Journal,* v. 97, Dec. 30, 1954, p. 770-773; disc., p. 773.

Assumptions necessary for satisfactory design. Diagrams. (E22)

86-E. **Plaster Mold Process Gives Better Aluminum, Magnesium Castings.** G. R. Gardner. *Iron Age,* v. 175, Jan. 13, 1955, p. 88-90.

Technique for producing thin-walled castings with smooth surfaces and good mechanical properties. Diagrams, photographs. (E16, Q general, Al, Mg)

87-E. (Czech.) **Use of Small Coke for Cupola of 1200 Mm. Diameter.** Bretislav Sochor and Svatopluk Jouza. *Slévarenstvi,* v. 2, no. 11, Nov. 1954, p. 323-327.

Optimum size found to be 1/10 to 1/15 of i.d. of cupola. Graphs, diagrams, tables. 16 ref. (E10)

88-E. (Czech.) **Casting of Cutting Tools.** Otakar Moravek. *Slévarenstvi,* v. 2, no. 11, Nov. 1954, p. 335-338.

Production techniques and advantages of cast milling cutters. Photographs. (E11, G17, CI)

89-E. (French.) **Study of the Flow of Metal in Molds. Practical Application of Scientific Principles. Results.** Charles Trencklé. *Fonderie,* 1954, no. 106, Nov., p. 4207-4226; disc., p. 4226-4228.

Machine or hand-molded flat pieces cast in green sand with ordinary cast iron. Graphs, diagrams, tables, micrographs. 12 ref. (E19, CI)

90-E. (French.) **A Large Dutch Foundry's Experience, After the War, With the Cement Sand Molding Method.** A. de Bruin. *Fonderie,* 1954, no. 106, Nov., p. 4229-4234.

Reorganization of shops and training of personnel in cement sand molding procedures. Photographs, diagrams, graph. (E19)

91-E. (French.) **The Precision Foundry.** W. H. Sulzer. *Métallurgie et la construction mécanique,* v. 86, no. 11, Nov. 1954, p. 823 + 7 pages.

Lost wax process, materials used in precision foundry, construction principles, economic aspects. Photographs, diagrams, tables. (E15)

92-E. (German.) **The Deoxidation of Cast Iron Melts by Subsequent Treatment and Its Effect on the Structure.** Hans Schiffers. *Giesserei,* v. 41, no. 25, Dec. 9, 1954, p. 661-672.

Effect of ladle additions; crystallization of nodular graphite. Tables, graphs, micrographs. 38 ref. (E25, N12, CI)

93-E. (Polish.) **Casting Properties of Nodular Cast Iron.** Cz. Kalata, J. Piaskowski and Z. Falecki. *Prace Instytutu Odlewnictwa,* v. 3, no. 2, 1953. p. 49-54.

Fluidity is higher than for initial cast iron; it has tendency to form shrinkage holes. Diagrams, tables, micrographs, graph. 4 ref. (E25, CI)

94-E. (Polish.) **New Core Binders Based on Starch and Cellulose.** T. Rzepa. *Prace Instytutu Odlewnictwa,* v. 4, no. 4, 1954, p. 125-130.

Conditions and range of applications. Tables. (E21)

95-E. (Russian.) **Influence of Mold Temperature and Vacuum in it on**

Fluidity of Steel. Iu. A. Nekhendzi and P. V. Sorokin. *Liteinoe Proizvodstvo,* 1954, no. 8, Nov., p. 17-20.

Experimental data and details of test equipment. Photograph, graphs, diagrams. 3 ref. (E25, CI)

96-E. (Russian.) **Seasonal Gas Porosity in Aluminum-Silicon Alloy Ingots.** A. A. Gorshkov and S. V. Vargin. *Liteinoe Proizvodstvo,* 1954, no. 8, Nov., p. 14-16.

Use of gaseous chlorine in the melt prevents absorption of hydrogen from air during periods of high humidity. Tables, graphs, micrograph. 12 ref. (E10, Al)

97-E. (Russian.) **Chlorine Treatment of Magnesium Alloys.** M. V. Sharov and B. S. Morozov. *Liteinoe Proizvodstvo,* 1954, no. 8, Nov., p. 20-22.

Effects of casting in chlorine, argon and helium atmospheres on porosity caused by absorption of hydrogen. Tables, graph. 2 ref. (E25, Mg)

98-E. Research Into the Use of Tannin-Base Corebinders. *Foundry Trade Journal,* v. 98, Jan. 6, 1955, p. 11-12.

Short stoving time permits high rates of core production. (E21)

99-E. Some Recent Developments in the Lost-Wax Casting Process. J. S. Turnbull. *Machinery (London),* v. 86, Jan. 7, 1955, p. 37-47.

Production of patterns; casting variations; economic considerations. Diagrams, photographs. (E15)

100-E. Magnesium Investment Castings Save Weight. John B. Campbell. *Materials & Methods,* v. 41, Jan. 1955, p. 94-95.

Advantage of high strength-weight ratio; economics of investment casting. Photographs. (E15, Mg)

101-E. (Czech.) **Dry Molding Mixtures With Quartz Sand.** Lev Petrzela. *Slévarenstvi, v. 2; Prace Ceskoslovenského Vyzkumu Slévarenského,* v. 1, no. 13, Dec. 1954, p. 89-100.

Evaluation of sand and clay mixtures for various casting conditions for steel and gray iron. Graphs, tables. 63 ref. (E18, CI)

102-E. (Dutch.) **Cement Sand as a Material for Foundry Molds. Points of Consideration on the Application of the Cement-Sand Molding Method.** H. G. Levelink. *Metalen,* v. 9, no. 24, Dec. 31, 1954, p. 395-398.

Properties of cores; advantages and disadvantages over other types of sand binders. 1 ref. (E18)

103-E. (German.) **Deoxidation of Cast Iron Melts by Subsequent Treatment and Its Effect on Structure.** Hans Schiffers. *Giesserei,* v. 41, no. 26, Dec. 23, 1954, p. 693-699.

Chemical and vacuum methods of deoxidizing; effect of deoxidizing and deoxidants on desulfurization and carbon content; mechanism of spherical graphite formation. Graphs, micrographs. 17 ref. (E25, N8, CI)

104-E. (Hungarian.) **Hungarian and Foreign Experiences in the Manufacture of Centrifugally Cast Cylinder Bushings.** Tibor Budinszky and Jozsef Gerédi. *Ontöde,* v. 5, no. 6, June 1954, p. 121-128.

Measures for securing a wear resistant surface structure; use of graphite instead of sand cores; elimination of defects. Photographs, diagrams. (E14, CI)

105-E. (Hungarian.) **Some Problems of Design in Machine Castings.** Jozsef Racz. *Ontöde,* v. 5, no. 8, Aug. 1954, p. 180-186.

Practical suggestions for meeting increased demands for quality include the reduction of hardness differences within the same piece and use of risers. Problems of core applications. Diagrams, tables. (E21, E22, CI)

106-E. (Polish.) **Synthetic Resins as Foundry Core Binders.** Ignacy Bursztyn, Jan Buciewicz and Tadeusz Rzepa. *Przeglad Odlewnictwa,* v. 4, no. 9, Sept. 1954, p. 241-251.

Tests on urea-formaldehyde compounds as substitutes for expensive natural fatty oils. Graphs. 16 ref. (E21)

107-E. (Polish.) **Example of the Use of the Fluidity Test in Determining the Causes of Defects in a Cast Iron Foundry.** Roman Krzeszewski and Jan Marcinkowski. *Przeglad Odlewnictwa,* v. 4, no. 11, Nov. 1954, p. 313-317.

Experience in lowering the number of rejects. Tables, photograph. (E25, CI)

108-E. Salvaging Defective Light Alloy Castings. W. M. Halliday. *Canadian Metals,* v. 18, Jan. 1955, p. 29-30, 31.

Avoidance and/or repair of typical defects. (E general, A8, Mg, Al)

109-E. Precision Casting by the Lost-Wax Process. J. S. Turnbull. *Engineering,* v. 179, Jan. 7, 1955, p. 22-24.

Includes investment process, solid-mold technique, centrifugal casting, vacuum casting and progressive solidification. Photographs. (E15, E14, E25)

110-E. Improve Mold Feeding Systems to Cut Casting Scrap. W. M.

Halliday. *Iron Age,* v. 175, Jan. 27, 1955, p. 82-85.

Reduction of sand, slag and dross pick-up; control of temperature gradient and metal flow. Diagrams. (E23)

111-E. (Polish.) **Modified Malleable Cast Iron.** Waclaw Sakwa. *Wiadomosci Hutnicze,* v. 10, no. 12, Dec. 1954, p. 338-343.

Methods for reducing heating cycle; ferritic and pearlitic iron obtained from cupolas; heat treatment; structure and strength. Graphs, tables. 4 ref. (E25, E10, J general, Q23, CI)

112-E. Cupola Gas Scrubbers. O. J. Brechtelsbauer. *American Foundryman,* v. 27, Feb. 1955, p. 34-37.

Wet gas scrubbers proved economical solution to cupola emission problem. Photographs, diagrams, table. (E10)

113-E. Casting Steel Pots for Metallurgical Use. T. R. Stanley. *American Foundryman,* v. 27, Feb. 1955, p. 42-46.

Production of large castings for handling molten lead and hot slag. Photographs. (E11, CI)

114-E. Reproducibility of Core Sand Tests. O. Jay Myers. *American Foundryman,* v. 27, Feb. 1955, p. 54-63.

Ways to minimize effects of variables in routine testing procedures. Photographs, tables, graphs, diagram. 22 ref. (E18)

115-E. Fahralloy Foundry Saves With Cost and Quality Control. K. Blake. *Canadian Metals,* v. 18, Feb. 1955, p. 29-30.

Methods which have gained these objectives. (E general, CI)

116-E. Importance of Slag Control in Acid Cupola Operation. E. A. Loria. *Foundry,* v. 83, Feb. 1955, p. 84-87, 240, 242-245.

Effects of slag compositions and characteristics on metal composition. Diagram, graphs, table. 6 ref. (E10, CI)

117-E. Operating Practice With the Basic-Lined Cupola. Charles Greenlee. *Foundry,* v. 83, Feb. 1955, p. 88 + 7 pages.

Advantages of basic operation are lower sulfur pickup, greater carbon pickup, higher tap temperatures, cheaper charge materials, better pouring characteristics and more uniform metal. Diagrams, table, photographs. (E10, CI)

118-E. Use of Rice and Oat Hulls as Riser Insulation. S. L. Gertsman and R. K. Buhr. *Foundry,* v. 83, Feb. 1955, p. 92-94.

Evaluation tests show that 3-in. covering produce sound castings with no carbon buildup. Graphs, tables, diagram, photographs. 1 ref. (E22, CI)

119-E. Planning Influences Pattern Quality. Robert H. Herrmann. *Foundry,* v. 83, Feb. 1955, p. 100-105.

Practices for insuring high-quality patterns. Photographs. (E17)

120-E. Development of the Lost-Wax Process of Precision Casting, 1949-53. J. S. Turnbull. *Foundry Trade Journal,* v. 98, Jan. 13, 1955, p. 31-39; Jan. 20, 1955, p. 65-74.

Appraisal of techniques, advantages, economic considerations. Photographs, diagrams. (E15)

121-E. Cleaning of Castings. L. B. Childe. *Foundry Trade Journal,* v. 98, Jan. 27, 1955, p. 87-97.

Processes and equipment for abrasive blasting to remove foreign material, flashes and surface roughness from castings. Photographs, graph. (E general, L10)

122-E. How Redesign Boosted Strength of Cast Iron Compressor Cylinder. T. H. Burke. *Iron Age,* v. 175, Feb. 10, 1955, p. 100-103.

Includes diagrams, photographs, tables. (E general, CI)

123-E. Shell Molding—The Process and Its Possibilities. Otto W. Winter. *Tool Engineer,* v. 34, Feb. 1955, p. 73-82.

Tool engineering is rapidly advancing the art of shell mold casting because it lends itself so well to automatic operations. Photographs, diagrams. (E16)

124-E. Tuyere for Blowing Oxygen Into Forehearth of Cupola. V. A. Fuklev and M. A. Khabarov. *Henry Brutcher Translation no.* 3299, 7 p. Henry Brutcher, Altadena, Calif. (From *Liteinoe Proizvodstvo,* v. 3, no. 9, 1952, p. 24-25.)

Design, operation and performance of tuyere for superheating cast iron during production. Diagrams, graph. (E10, CI)

125-E. 'Drying' (Hardening) of Foundry Sand Molds by the Use of Carbon Dioxide. S. I. Sysoev. *Henry Brutcher Translation no.* 3410, 3 p. Henry Brutcher, Altadena, Calif. (From *Liteinoe Proizvodstvo,* v. 3, no. 1, 1952, p. 5.)

Application and advantages of molds and cores prepared by a chemical baking process. 1 ref. (E19, CI, ST, Cu, Al)

126-E. Carbon Dioxide in Molding Sand Produces High-Strength Molds.

W. Magers. *Henry Brutcher Translation no.* 3411. 4 p. Henry Brutcher, Altadena, Calif. (From *Giesserei-Praxis,* v. 71, no. 23, 1953, p. 418.)
Critical examination of the process and suggestions for its improvement. (E19)

127-E. (French.) **Gravity Die Casting of Light Alloys. IV.** Henry Garnier. *Revue de l'aluminium,* v. 31, no. 215, Nov. 1954, p. 391-396.
Linear shrinkage, dimensions, inserts, molds, melting and pouring. Diagrams. 4 ref. (E13, E23, Al)

128-E. (German.) **Evaluating Coke With Cupola Research.** Hans Jungbluth. *Giesserei,* v. 42, no. 1, Jan. 6, 1955, p. 2-6.
Coke-evaluation index; relations between melting efficiency, coke charge, amount of air and combustion conditions; reactivity of various cokes; mechanism of raising the temperature of the iron. Graphs, table. 22 ref. (E10)

129-E. "Pop-Off"-Type Moulding Boxes for the Mechanized Production of Light Castings. A. J. Crook. *Foundry Trade Journal,* v. 98, Feb. 10, 1955, p. 141-148.
Description of full mechanization of foundry where previously loose-pattern molding methods had been used. Photographs, diagrams. (E19, CI)

130-E. Another Look at "Expansion"-Type Scabs. Douglas C. Williams. *Foundry Trade Journal,* v. 98, Feb. 17, 1955, p. 169-174.
Hypothesis for explaining formation of scabs in iron and steel castings. Photograph, tables. 8 ref. (E11, CI)

131-E. Plaster Mold Casting. R. B. Anderson. *Product Engineering,* v. 26, Feb. 1955, p. 193-199.
Technique and applications of this somewhat limited process. Tables, photographs. (E16, Cu, Zn, Al)

132-E. (French.) **Preparation Standard for A-S20 U.** *Fonderie,* 1955, no. 108, Jan., p. 4337-4339.
Procedure for melting and casting hypereutectic aluminum-silicon alloys containing copper and possibly tin. Micrographs. (E10, Al, Si, Cu, Sn)

133-E. (French.) **Mechanization of Foundry Processes.** J. Pascal. *Métallurgie et la construction mécanique,* v. 87, no. 1, Jan. 1955, p. 23, 25-27.
Means for transporting liquid metal. Economics of mechanization. 7 ref. (E general, A5)

134-E. (German.) **Orienting Experiments on Foundry Practice.** Ludger Frede. *Giesserei,* v. 42, no. 2, Jan. 20, 1955, p. 41-42.
Experimental study of flow in molds. Diagrams, photographs. 3 ref. (E23)

135-E. (German.) **Dielectric Drying of Cores.** Kaarlo Wirta. *Giesserei,* v. 42, no. 3, Feb. 3, 1955, p. 49-54.
Principle and design of high-frequency core-drying furnaces; laboratory investgations on cores with different binders, water contents and pH values; process is not suitable for cores with oil binders. Diagrams, photographs, graphs, tables. 1 ref. (E21)

136-E. (German.) **Effect of Foundry Sand on the Finished Casting.** Hans Derlon. *Giesserei,* v. 42, no. 3, Feb. 3, 1955, p. 55-57.
Effect of type, shape and grain size of sand and gas permeability of mold on the quality of the casting. Diagram, micrographs, graphs. 8 ref. (E18)

137-E. (German.) **Plant Experiences With the Graphite-Bar Melting Furnace.** H. Reinfeld. *Giesserei,* v. 42, no. 3, Feb. 3, 1955, p. 60.
Brief report on the efficiency of furnace. Graphs. 1 ref. (E10)

138-E. (German.) **The Effect of Extremely Low Beryllium Contents in Magnesium Alloys.** Karl Ernst Mann. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 17-24.
Effect of beryllium on the casting behavior, mechanical and chemical properties, surface condition and microstructure of magnesium-aluminum alloys. Graphs, photographs, micrographs, tables. 8 ref. (E25, Q general, M27, Mg, Al)

139-E. (Russian.) **Prevention of Contraction Porosity of Chill Cast Magnesium Alloys.** A. M. Osokin. *Liteinoe Proizvodstvo,* 1955, no. 1, Jan., p. 1-3.
Optimum conditions of casting and heat treatment for prevention of porosity. Tables, photographs. 2 ref. (E25, Mg)

140-E. (Russian.) **Production of High-Strength Cast Iron in a Forehearth Cupola Furnace.** I. P. Petrov. *Liteinoe Proizvodstvo,* 1955, no. 1, Jan., p. 3-5.
Introduction of metallic magnesium and ferrosilicon directly in the forehearth; furnace construction. Table, micrographs, diagram. (E10, CI)

141-E. (Swedish.) **Casting Defects and Their Causes. VI. Mold Wall Analysis.** *Gjuteriet,* v. 45, no. 1, Jan. 1955, p. 1-5.

Factors affecting properties of mold surfaces. Table. (To be continued.) (E25)

142-E. Nondestructive Testing Aids Casting Design. Robert H. Herrmann. *Foundry,* v. 83, Mar. 1955, p. 84-87.

Use of brittle lacquer and strain gages to aid in redesign or load-bearing castings. Photographs. (E17, Q25)

143-E. Reclaiming Core Sand. William D. Dunn. *Foundry,* v. 83, Mar. 1955, p. 90-95.

Factors to be analyzed before installing sand reclamation in nonferrous foundries. Diagrams, photographs, tables. (E18)

144-E. A Study of Investment Materials. H. O. McIntyre. *Foundry,* v. 83, Mar. 1955, p. 96-99.

Characteristics and applications of usual investment materials. Photographs, graphs. (E15)

145-E. New Ingot Mold Foundry. Edwin Bremer. *Foundry,* v. 83, Mar. 1955, p. 100-105.

Equipment and operations in highly mechanized foundry. Photographs, diagram. (E general, CI)

146-E. The Use and Care of Crucibles. W. M. Halliday. *Foundry,* v. 83, Mar. 1955, p. 106-109.

Safety and economic considerations for handling, storing and use of graphite crucibles. Photographs. (E10)

147-E. Production of Large Steel Castings. J. B. Mohler. *Foundry,* v. 83, Mar. 1955, p. 113-115.

Practice used for molding and pouring castings larger than 150 tons each. Photographs. (E19, E23, CI)

148-E. Colloidal Graphite Mixtures Aid Nonferrous Casting Techniques. W. A. Mader. *Iron Age,* v. 175, Mar. 3, 1955, p. 124-126.

Benefits of graphite coatings on chills, cores, dies and pins; use as lubricant on foundry machines. Photographs. (E25)

149-E. (Book.) Shell Molding and Shell Molding Castings. T. C. Du Mond. 128 p. 1954. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $2.00.

Description of process, advantages and limitations, costs, and factors influencing selection of the process for various castings. (E16)

150-E. (Czech.) **Industrial Production of Spheroidal Cast Iron at High Pressure.** Vlastislav Otahal. *Slévarenstvi,* v. 3, no. 1, Jan. 1955, p. 2-6.

Use of 4.5 to 5.5 atmospheres reduces amount of magnesium required for inoculation. Graphs, photographs, diagram. 13 ref. (E25, CI)

151-E. (Czech.) **Mechanization of Permanent Mold Casting of Gray Iron.** Karel Mlcoch. *Slévarenstvi,* v. 3, no. 1, Jan. 1955, p. 6-9.

Automatic rotating machine reduces costs by as much as 25%. Photographs. 6 ref. (E12, CI)

152-E. (Czech.) **Hydrometer Method Determines Clay Content of Foundry Sands.** Jiri Ornst. *Slévarenstvi,* v. 3, no. 1; *Prace Ceskoslovenského Vyzkumu Slévarenského,* v. 2, no. 14, Jan. 1955, p. 101-106.

Simple method evaluates sand mixtures in about 15 min. but does not replace standard method for precise determinations. Graphs, tables. 17 ref. (E18)

153-E. (Hungarian.) **Metal Penetration Into the Material of the Mold.** Zoltan Nagy. *Ontöde,* v. 6, no. 1, Jan. 1955, p. 7-12.

Investigations to eliminate defects caused by the sand burning on the casting. Diagrams, graphs, tables. 8 ref. (E19)

154-E. (Hungarian.) **Causes of Defects in Nonferrous Metal Castings.** Laszlo Jakoby. *Ontöde,* v. 6, no. 2, Feb. 1955, p. 32-39.

Suggestions for overcoming defects resulting from casting procedures or core preparation. Diagrams, tables. (E25, Al, Zn)

155-E. (Russian.) **Hydrodynamic Theory of Horizontal Centrifugal Casting.** B. F. Vilium. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 10, Oct., p. 39-46.

Mathematical solution of flow of molten metal during centrifugal casting. Diagrams, table. 2 ref. (E14)

156-E. (Russian.) **Casting of Complex Machine Parts Using Magnesium Cast Iron.** V. I. Soldatenko, M. I. Rotenberg and V. M. Iangunaev. *Liteinoe Proizvodstvo,* 1955, no. 2, Feb., p. 5-6.

Method of alloying and casting. Table, micrographs. (E11, CI)

157-E. (Russian.) **Peculiarities in Production of Magnesium Cast Iron.** V. A. Zakharov. *Liteinoe Proizvodstvo,* 1955, no. 2, Feb., p. 14-16.

Experimental investigation of the influence of magnesium on carbon content, form of residual graphite and general metallographic struc-

ture. Tables, micrographs. 2 ref. (E25, CI)

158-E. Use of Basic Ladle Linings in the Foundry. K. T. Apgar. *American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint,* 1954, 1 p.

Lining practice required for Hadfield steel. (E10, CI)

159-E. Solidification Sequences and Their Significance. I. C. H. Hughes. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Feb. 1955, p. 518-536 + 4 plates.

Shrinkage characteristics of flake graphite and nodular graphite irons. Correlation of shrinkage defects. Diagrams, graphs, micrograph, photographs. 11 ref. (E25, CI)

160-E. The Solidification of Castings in Relation to Their Soundness. Microscopic and Thermal Analyses of Solidification in 2-In. Grey Iron Bars. J. H. Gittus and I. C. H. Hughes. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Feb. 1955, p. 537-554 + 10 plates.

Modes of solidification of low-phosphorus flake graphite, high-phosphorus flake graphite, and nodular graphite cast irons of sand-cast bars quenched at various times during solidification were studied. Table, graphs, micrographs, photographs. (E25, CI)

161-E. The Effect of Dead Clay on the Properties of Clay-Bonded Sand. W. B. Parkes and A. G. Sealey. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Feb. 1955, p. 555-562.

Tests to determine nonplastic clay by means of moisture content. Methods of controlling dead clay and neutralizing its effect. Graphs. 1 ref. (E18)

162-E. The Collection of Cupola Dust. F. M. Shaw. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Feb. 1955, p. 563-592.

Characteristics of cupola dust and dust collectors. Tables, diagrams, graphs. 32 ref. (E10, A8)

163-E. Battery of Timers Controls Cycle Sequence. Otto W. Winter and Frank B. Hall. *Electrical Manufacturing,* v. 55, Mar. 1955, p. 110-117.

Synchronous timers permit automation of shell molding machine. Photographs, diagrams, circuit diagrams. (E16)

164-E. Melt-Quality Tests for Copper-Base Alloys. A. R. French. *Foundry Trade Journal,* v. 98, Mar. 10, 1955, p. 253-257; Mar. 17, 1955, p. 281-293.

Types of prepouring tests; evaluation of test results from standpoint of service properties desired and metallurgical characteristics. Photographs, micrographs, diagrams, tables. 16 ref. (E25, Cu)

165-E. Some Uses of Silica Sols in Precision Investment Casting. D. J. Cloherty and H. G. Emblem. *Industrial Chemist and Chemical Manufacturer,* v. 31, Mar. 1955, p. 111-114.

Seeks replacements for the flammable ethyl silicate binder. Tables, diagram. 14 ref. (E15)

166-E. Shell Molding for Short-Run Production. Frank K. Shallenberger. *Product Engineering,* v. 26, Mar. 1955, p. 175-179.

Advantages and applicability of the process; 12 specific guides to minimum piece cost. Photographs, table. (E16)

167-E. Shell Molding. Curtis L. Graversen. *Western Machinery and Steel World,* v. 46, Mar. 1955, p. 84-87.

Basic principles; advantages and disadvantages; typical applications; future possibilities. Photographs. (E16)

168-E. Cupola With Oxygen-Enriched Blast. V. N. Filippov. *Henry Brutcher Translation No.* 3429, 3 p. (From *Liteinoe Proizvodstvo,* 1952, no. 5, p. 27.) Henry Brutcher, Altadena, Calif.

Procedures for treating cupola iron with oxygen; effects on mechanical properties of cast iron. Diagrams. (E10, Q general, CI)

169-E. (French.) **High Strength Cast Irons Without Special Elements. I. Technical Factors of the Problem.** J. Pascal. *Métallurgie et la construction mécanique,* v. 87, no. 2, Feb. 1955, p. 95-97, 99, 101.

Foundry techniques for making high-strength castings. (To be continued.) (E general, Q23, CI)

170-E. (German.) **The Layering Process, a Means for Determining the Casting Method and Casting Rate for Steel.** Sten Forslund. *Giesserei,* v. 42, no. 4, Feb. 17, 1955, p. 73-81.

Processes of movement at the metal front; processes during cold casting. Details and advantages of the layering process. Photographs, diagrams, graphs. (E11, CI)

171-E. (German.) **Chemical Attacks of the Melting and Fluxing Agents as Well as of the Metals on the Graphite Crucible.** Elisabeth Lotze. *Giesserei,* v. 42, no. 4, Feb. 17, 1955, p. 85-88.

Observations on various attacks; examples of crucible defects; practical suggestions. Photographs. (E10)

172-E. (German.) **Effect of Silicon, Copper, Zinc, and Magnesium on Cracking, Flowability, and Strength Properties of Cast Alloy G $AlSi_6Cu_3$.** Eduard Bertram, Wilhelm Patterson and Rudolf Kümmerle. *Giesserei,* v. 42, no. 5, Mar. 3, 1955, p. 97-102.

Casting characteristics and mechanical properties; effects of foundry variables. Graphs, table, diagrams, photograph. 4 ref. (E general, Q23, Al)

173-E. (German.) **Melting With Inert Coke.** Wilhelm Heinrichs. *Giesserei,* v. 42, no. 5, Mar. 3, 1955, p. 102-106.

Advantages of melting with high-carbon coke. Tables, graphs, micrographs. 3 ref. (E10, CI)

174-E. (German.) **Segregation in Heavy-Metal Casting.** Rudolf Rövenstrunk. *Giesserei,* v. 42, no. 5, Mar. 3, 1955, p. 111-112.

Causes and prevention of segregation in lead alloy castings. Diagrams. (E25, Pb)

175-E. (German.) **Technical Testing of Pressure Castings.** Gustav Lieby. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 137-146.

Quality control; use of various testing procedures. Diagrams, photographs. 10 ref. (E13)

176-E. (Swedish.) **Casting Defects and Their Causes. VII. Mold Wall Analysis.** *Gjuteriet,* v. 45, no. 2, Feb. 1955, p. 17-21.

Properties of mold walls and factors controlling them. Tables. 13 ref. (E25)

177-E. (Swedish.) **Dephosphorization of Cast Iron by the Addition of Magnesium, Calcium, and Cerium Under Reducing Conditions.** G. Ostberg. *Gjuteriet,* v. 45, no. 2, Feb. 1955, p. 24-25.

Theoretical and practical aspects of the process which currently seems to be practical for dephosphorization of ferro-alloys. Table. 8 ref. (E10, CI)

178-E. **Steel Penetration.** R. C. Emmons and Jack Bach. *Foundry,* v. 83, Apr. 1955, p. 108-116.

Causes; mechanism of action; corrective measures. Micrographs, photographs, graphs, tables, diagrams. 2 ref. (E25, CI)

179-E. (Czech.) **Production of Spheroidal Cast Iron at the V. M. Molotov Works in Trinec.** Milos Stareck. *Slévarenstvi,* v. 3, no. 2, Feb. 1955, p. 36-41.

Controlled cast iron melting, for magnesium inoculation, results in the production of the heaviest spheroidal iron casting possessing good structure and mechanical properties. Micrographs, tables, diagram, photograph. (E25, CI)

180-E. (Czech.) **Centrifugal Casting of Tubular Steel Castings.** Frantisek Wiesner. *Slévarenstvi,* v. 3, no. 2, Feb. 1955, p. 44-47.

Several methods and theories and various types of centrifugal machines, with horizontal or vertical rotational axis, described. Diagrams, table, graph. 4 ref. (E14, CI)

181-E. **Improving Investment Casting Quality.** D. G. McCullough, F. J. Webbere and R. F. Thomson. *American Foundryman,* v. 27, Apr. 1955, p. 56-61.

Level of stress-rupture properties obtained for a nickel-chromium-iron alloy was raised and spread in results was decreased by gating investment cast test bars in accordance with practices determined by study of fluid flow characteristics in transparent plastic mold models. Photographs, graphs, diagrams. (E15, Ni)

182-E. **Risering Ductile Cast Iron.** R. A. Flinn, D. J. Reese and W. A. Spindler. *American Foundryman,* v. 27, Apr. 1955, p. 62-66.

How to calculate risering that will adequately prevent either centerline or riser-neck shrinkage. Tables, graph, radiographs, photographs. 2 ref. (E22, CI)

183-E. **Defects in Steel Castings.** R. A. Boustred. *Foundry Trade Journal,* v. 98, Mar. 24, 1955, p. 311-319.

Causes and remedies for blowholes, pinholes, shrinkage defects, scabs and other casting defects. Photographs, micrographs, table. (E25, CI)

184-E. (Norwegian.) **Gases in Cast Iron.** Edgar Bull Simonsen. *Tidsskrift for Kjemi, Bergvesen og Metallurgi,* v. 15, no. 1, 1955, p. 6-12.

Effects of hydrogen, oxygen and nitrogen. Tables, graph. 22 ref. (E25, CI)

185-E. **Process Engineering in the Foundry Industry.** Jerome R. Young. *Foundry,* v. 83, May 1955, p. 104-105.

Emphasizes importance of process engineers in improving casting quality and increasing economy in foundry operations. Photographs, table. (E general)

186-E. **Foundry Processes.** *Foundry,* v. 83, May 1955, p. 106-127.

Trends and new developments in

molding, melting, metals, heat treating and testing. Photographs. (E general)

187-E. Foundry Specializes in Centrifugal Casting. Edwin Bremer. *Foundry,* v. 83, May 1955, p. 130-135.
Products include wide range of hollow cylindrical tubes which vary in size from 3 to 54 in. in diam., up to 27 ft. in length, and from 25 to 60,000 lb. in weight. Both ferrous and nonferrous alloys are cast. Photographs, diagram. (E14)

188-E. Relationship Between Pouring Temperature, Porosity and Tensile Strength of Sand-Cast Bronze. W. T. Pell-Walpole. *Foundry Trade Journal,* v. 98, Mar. 31, 1955, p. 341-348.
Experimentation on effect of pouring temperature, using metal of controlled gas content, close control of casting variables and molds and mold coatings of selected composition with respect to their capacity for producing hydrogen. Graphs, table. 9 ref. (E25, E23, Cu)

189-E. Large, Intricate Shapes Made by Investment Casting. Irvin R. Kramer and Davidlee Von Ludwig. *Materials & Methods,* v. 41, Apr. 1955, p. 106-109.
Frozen mercury technique makes possible castings weighing 80 to 100 lb. and dimensions in excess of 36 in. Diagrams. (E15)

190-E. (Czech.) **Original and Secondary Defects of Casting.** Josef Pribyl. *Slévarenstvi,* v. 3, no. 3, Mar. 1955, p. 69-72.
Causes and analyses of casting defects. Diagrams. 6 ref. (E25)

191-E. (French.) **Green-Sand Molding of Copper Alloys.** Michel Goret and Pierre Delanoy. *Fonderie,* 1955, no. 109, Feb., p. 4385-4391.
Specifications for material and sands to be used. Diagrams, photograph. (E19, Cu)

192-E. (French.) **Some Developments in the Art of Casting Metals and Alloys.** L. W. Pateman and J. B. Rait. *Revue de métallurgie,* v. 52, no. 1, Jan. 1955, p. 33-46.
Developments in foundry practices, including investment casting, shell molding and centrifugal casting. Photographs, diagrams, micrographs. 34 ref. (E15, E16, E14)

193-E. (German.) **Surface Tension of Cerium Treated Cast Iron.** Rudolf Gautschi and Borut Marincek. *Giesserei,* v. 42, no. 6, Mar. 17, 1955, p. 121-123.
Relation between surface tension and formation of nodular graphite. Influence of cerium addition. Tables, micrograph, diagram. 10 ref. (E25, P10, CI)

194-E. (German.) **Study of Combustion in Cupola Furnace.** J. Navarro Alcacer and J. A. Andrés. *Giesserei,* v. 42, no. 6, Mar. 17, 1955, p. 124-127.
Method and installation used. Tables, graphs, diagrams. 4 ref. (E10)

195-E. (German.) **Investigation of Vertical Movements of the Metal When Flowing Into the Mold.** Tung-Ping Yao. *Giesserei,* v. 42, no. 7, Mar. 31, 1955, p. 145-153.
Theoretical analysis of flow, influence of gas pressure, "hydraulic shock effect" and "hydraulic jump effect", changes in properties of metals during flow. Graphs, diagrams. 7 ref. (E19)

196-E. (Russian.) **Mechanism of Nodular Graphite Formation.** A. A. Gorshkov. *Liteinoe Proizvodstvo,* 1955, no. 3, Mar., p. 17-20.
Analysis of the chemical reactions of metals with a low melting point —magnesium, magnesium alloys, or cerium and cast iron. Diagrams. 41 ref. (E25, Mg, Ce, CI)

197-E. (Russian.) **Cause of Gas Saturation of Silicon Brass.** V. M. Chursin and D. P. Lovtsov. *Liteinoe Proizvodstvo,* 1955, no. 3, Mar., p. 25-27.
Theoretical and experimental investigation of gas formation during smelting; influence of impurities in basic element; gas elimination methods. Drawings, tables, diagrams. 3 ref. (E10, Cu, Si)

198-E. (Swedish.) **Feeding and Solidification. V. Placing and Dimensioning of Feeders.** K. Akesson. *Gjuteriet,* v. 45, no. 3, Mar. 1955, p. 31-38.
Position, in relation to heat center of casting, and method of determining size of feeders. Diagrams, table, graph. 4 ref. (E23, E25)

199-E. Investment Casting. I-III. *American Machinist,* v. 99, Apr. 25, 1955, p. 155, 157, 159.
Methods of controlling pattern shrinkage; larger casting problems; mold cracking. Diagrams. (E15)

200-E. Metallurgical Blast Cupola Offers Improved Melting Efficiency. S. T. Jaswinski. *Iron Age,* v. 175, Apr. 21, 1955, p. 87-91.
Combines operating characteristics of blast furnace with low pressure blast and continuous tapping features of conventional cupola. Photographs, micrographs, tables. (E10)

201-E. Precision Alloy Steel Castings. *Iron & Steel,* v. 28, Apr. 1955, p. 135-137.
Advantages of process, structural and mechanical properties, design and examples of application. Photographs, table, micrograph. (E15)

202-E. Guide to Ejector Pin Mounting. W. M. Halliday. *Precision Met-*

al Molding, v. 13, May 1955, p. 45-50.
Effect of ejector design on flash, distortion and inaccuracy, speed of casting and life and maintenance of die. Diagrams. (E13)

203-E. Eliminate Leakage of Airborne Castings. Lowell Palmer. *Precision Metal Molding,* v. 13, May 1955, p. 55-58.
Castings are impregnated by three different methods. Table, photographs. (E25)

204-E. Production of Foundry Cores by the Carbon Dioxide Process and Equipment Needed. W. Saubermann. *Henry Brutcher Translation No.* 3409, 19 p. (Slightly abridged from *Giesserei-Praxis,* v. 73, no. 2, 1955, p. 29-32; no. 3, 1955, p. 49-51.) Henry Brutcher, Altadena, Calif.
Principles of and results obtained with a carbon dioxide "baking" process, which emphasizes lower costs. Diagrams. (E21)

205-E. (French.) **Influence of Copper on Cast Irons Containing Magnesium.** R. M. Lamb. *Fonderie,* 1955, no. 110, Mar., p. 4403-4412.
Possibilities of using copper with magnesium in the production of nodular cast iron. Tables, graphs, micrographs. (E25, Cu, Mg, CI)

206-E. (French.) **Functioning of an Average-Size Water-Cooled Cupola.** Pierre Hubert. *Fonderie,* 1955, no. 110, Mar., p. 4414-4422.
Operating characteristics and advantages and disadvantages of cupola installed in a cast-iron foundry. Diagrams, tables, graphs, photograph. (E10, CI)

207-E. (German.) **Further Development of Exothermic Riser Inserts in Steel Casting.** Friedrich Dubielzig and Heinz Kühne. *Giessereitechnik,* v. 1, no. 2, Feb. 1955, p. 13-15.
Changes in composition of the thermic mass; new casting technique. Photographs, table, graphs. 1 ref. (E22, ST)

208-E. (German.) **NE-Heavy Metal Centrifugal Casting. Development and Requirements for Centrifugal Casting Method.** R. R. Domanowski. *Metall,* v. 9, nos. 7-8, Apr. 1955, p. 291-297.
Process characteristics, mechanical potentials, selection of mold material, technical objectives, advantages and its recognition in German industrial standards. Tables. (E14)

209-E. (Hungarian.) **Correct Design of Machine Elements From the Point of View of Foundry Technology, With Special Regard to Steel Castings.** Géza Jandy. *Ontöde,* v. 6, no. 3, Mar. 1955, p. 47-54.
Factors to be considered in designing are composition, wall thickness, tensile strength, bend resistance, hardness and shrinkage of the casting; weldability and forgeability of steel castings. Tables, graphs, diagrams. (E general, CI)

210-E. (Hungarian.) **Application of Easily Removable Risers on Non-Ferrous Metals Castings.** Marton Solti, Pal Németh and Gyula Emöd. *Ontöde,* v. 6, no. 3, Mar. 1955, p. 59-63.
Composition and treatment of the separating plates; dimensions of risers that can be broken off. Diagrams, photographs. 3 ref. (E22, EG)

211-E. (Hungarian.) **Calculating the Gating Systems Applied in Iron Foundries.** Sandor Vékony. *Ontöde,* v. 6, no. 3, Mar. 1955, p. 63-65.
Problems of temperature, height of casting, dimension of horizontal canal. Diagrams, graphs, tables. (E22, CI)

212-E. (Pamphlet.) **Investment Precision Casting.** Report no. PB 111001-R. 27 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.
Summarizes latest developments in the preparation of dies and patterns, molding methods, compositions used, investment, and heating and melting methods. 192 ref. (E15)

213-E. (Book.) **Bibliography on Casting Defects.** 9 p. 1955. American Foundryman's Society, Des Plaines, Illinois.
A selected bibliography dealing with the most important literature references on casting defects. (E25)

214-E. Light Iron Castings and the New Die Pressing Process. R. S. M. Jeffrey. *American Foundryman,* v. 27, May 1955, p. 88-95.
Die pressing process for gutters and other castings produces low-cost, gray-as-cast iron in mechanized permanent molds. Tables, photographs, micrographs, diagrams. 10 ref. (E12, CI)

215-E. Stopping Blow-By in Core Boxes. Richard L. Olson. *American Foundryman,* v. 27, May 1955, p. 101-103.
Design of blow box with continuous dike-type seal. Photographs. (E21)

216-E. Die Lubricants—Facts and Fancies. H. K. Barton. *Machinery (London),* v. 86, Apr. 29, 1955, p. 925-930.
Purposes of lubricants, substances used, application and direct effect of release agents. Photograph. (E13)

217-E. Cast Bolts for Pipe Joints. C. K. Donoho. *Metal Progress,* v. 67, May 1955, p. 86-88.

Cast bolts are mass produced in metal molds with short-cycle annealing; nuts are gray iron, shell molded. Photographs, micrograph, diagram. (E12, E16, CI)

218-E. (German.) **Relation Between Viscous and Mechanical Properties of Bentonite.** Heinz Siegel. *Giesserei,* v. 42, no. 8, Apr. 14, 1955, p. 176-186.

Physical and mechanical properties, possibilities for improvement, fields of application of bentonite molds. Tables, diagrams, photographs. 8 ref. (E18)

219-E. (German.) **A New Sand Mold Binder.** Heinz Busch. *Giesserei,* v. 42, no. 8, Apr. 14, 1955, p. 187-191.

Composition; optimum relation between sand and binder; physical and mechanical properties of finished molds. Tables, graphs, photographs. 2 ref. (E18)

220-E. (Italian.) **Rational Designing of Castings.** *Fonderia,* v. 4, no. 2, Feb. 1955, p. 49-59.

Presents ten points to be considered in the designing of quality cast iron pieces. Diagrams, photographs. (E general, CI)

221-E. (Russian.) **Melting in a Cupola Furnace With a Chemically Basic Lining.** L. I. Levi. *Liteinoe Proizvodstvo,* 1955, no. 4, Apr., p. 3-8.

Desulfuration and dephosphorization processes; chemical composition and temperature of the cast iron; use of oxygen in the blast. Tables, graphs. 7 ref. (E10, CI)

222-E. Pinholing in Nodular Iron Castings. J. Gittus. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Apr. 1955, p. 594-603 + 4 plates.

Defect appears to be most pronounced in green sand-molded castings and can be alleviated both by additions of carbonaceous materials to the mold and by small additions to the metal of aluminum, tellurium and bismuth. A cerium addition is made to cancel any harmful effect due to these latter elements. Tables, diagrams, micrographs, photographs. 1 ref. (E25, CI)

223-E. Sinking Under Bosses on Thin Plates: Preliminary Experiments on Foundry Variables. I. C. H. Huches. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Apr. 1955, p. 616-627 + 4 plates.

Effects of melting and pouring temperatures, inoculation with ferrosilicon, molding practice and design variables upon sinking. Tables, photographs, graphs. (E25, CI)

224-E. Carbon-Dioxide Process. D. V. Atterton. *Foundry Trade Journal,* v. 98, May 12, 1955, p. 505-511; disc., p. 511-514.

Determining optimum additions of binder from point of view of strength by varying binder content when gassing cores for a constant time. Photographs, diagrams, graphs. (E19)

225-E. Carbon and Alloy Steel Castings. *Iron & Steel,* v. 28, May 1955, p. 189-194.

Plant and operating procedures of a British foundry. Photographs, diagrams. (To be continued.) (E11, CI)

226-E. Colloidal Graphite in the Foundry. W. A. Mader. *Modern Metals,* v. 11, May 1955, p. 40-41.

Unique properties make "Dag" dispersions ideal as chill coatings, mold wash, high temperature lubricants and parting compounds. Photographs. (E19)

227-E. Casting and Fabrication of High-Damping Manganese-Copper Alloys. J. A. Rowland, C. E. Armantrout and D. F. Walsh. *U. S. Bureau of Mines, Report of Investigations* 5127, Apr. 1955, 19 p.

Melting and casting; mechanical working and heat treating ingots. Graphs, photographs. 15 ref. (E general, F general, J general, Mn, Cu)

228-E. Investment Casting Gets Nod as Cost Saver for Parts. James B. Price. *Western Metals,* v. 13, May 1955, p. 49-51.

Precision casting equipment and procedures; advantages and applications. Photographs. (E15)

229-E. Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 34, May 1955, p. 111-112.

Melting procedures for copper alloys and cast iron. Table. (To be continued.) (E10, CI, Cu)

230-E. Automated Molding Line. Robert H. Hermann. *Foundry,* v. 83, June 1955, p. 74-80.

Production methods for automated and semi-automated molding lines, as well as related foundry sections of a gray iron foundry. Photographs, diagrams. (E19, CI)

231-E. The CO_2 Process. Its Use in British Foundries. Arnold Tipper. *Foundry,* v. 83, June 1955, p. 84-90.

Methods and equipment for making cores and molds using sodium silicate binders hardened by carbon dioxide gas. Photographs, table, diagram. (E18)

232-E. Molding Simplified by Change in Pattern. William Ferguson. *Foundry,* v. 83, June 1955, p. 91.

Improved pattern design permits easier withdrawal of cast stainless steel extractor screw. Photograph. (E17, SS)

233-E. New Plant Helps Promote Die Casting Quality. Kenneth L. Mountain. *Foundry,* v. 83, June 1955, p. 100-103.

Plant equipment and operating procedures. Photographs. (E13)

234-E. Strainer Core—Types and Applications. *Foundry,* v. 83, June 1955, p. 123-124, 127.

Advantages, dimensions, selection criteria. Photograph, diagram, table. (E21)

235-E. Trouble Shooting. Designing a Small Cupola. C. W. Ammen. *Foundry,* v. 83, June 1955, p. 128 + 4 pages.

Determination of dimensions, equipment and construction features. Diagrams. (E10)

236-E. Rothfischer Centrifugal Iron Pipe Casting Machines. *Machinery (London),* v. 86, May 13, 1955, p. 1034-1036.

Design of machine for casting water main pipes of various thicknesses. Photographs. (E14, CI)

237-E. Engineering Design Opportunities in Castings. (Digest of A.S.M. Lecture Course, "Why Castings", by Hans J. Heine; Presented before the Louisville, Ky., Chapter, Mar. 1955.) *Metal Progress,* v. 67, June 1955, p. 148, 150, 152.

Engineering design opportunities in castings. Includes choice of casting accuracy, finish, mechanical properties, alloys used. (E general)

238-E. Die Castings for Machine Parts. David Laine. *Tool Engineer,* v. 34, June 1955, p. 79-80.

Die cast machine components result in lower weight, reduced production and lower assembly costs because of the one-piece construction inherent in the die casting process. Photographs. (E13, Al, Zn)

239-E. (Czech.) **The Adhesion of the Lead Bearing Alloy Overlay With the Steel Back.** Vladimir Suchanek. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 221-228.

Effects of variations in alloy composition, temperature of the bearing metal and that of the steel shell, and the rate and direction of cooling. Photographs, graphs, micrographs, diagrams, tables. 7 ref. (E general, T7, Pb)

240-E. (Russian.) **Feeding of Steel Castings Being Prepared by the Investment Casting Process.** M. L. Khenkin. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 1-6.

Pouring and teeming systems with feeding of castings from risers, cylindrical and circular collectors and special heads; relation of casting dimensions to riser and feeder dimensions and design; avoidance of brittleness, settling cracks and other defects. Diagrams, graphs, table, nomograms. 6 ref. (E15, E23, CI)

241-E. (Russian.) **Machine for Pressure Casting Nonferrous Metal Parts.** D. M. Nabrodov and L. M. Sobolev. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 10-11.

Design specifications and operational characteristics of press and heater. Diagrams. (E13)

242-E. (Russian.) **Experiment in the Modification of Cast Iron by Magnesium.** S. I. Vitenson, R. S. Tripol'skaia and R. I. Galaiko. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 18-19.

Chemical composition and specific weight of slags formed under different conditions of modification; use of various fluxes; chemical composition of different zones of the metal. Micrographs. photograph, tables. (E25, E10, CI)

243-E. Five Ways to Desulphurize. D. E. Parsons and S. L. Gertsman. *American Foundryman,* v. 27, June 1955, p. 60-65.

Results of investigation on the reduction of the sulfur content of gray iron by means of ladle treatment. Tables, graphs, micrographs. 6 ref. (E10, CI)

244-E. Quick Test for Melt Quality—Measures Gas Content. H. Rosenthal and S. Lipson. *American Foundryman,* v. 27, June 1955, p. 69-73.

Development of a gas content tester which has means for conveniently solidifying an aluminum sample under controlled reduced pressure. Gas content of the sample is qualitatively determined by examining the appearance of the surface of the sample. Photographs, diagram, graphs. 9 ref. (E25, Al)

245-E. How to Measure Molding Sand Blowability. Donald M. Murray. *American Foundryman,* v. 27, June 1955, p. 78-81.

Investigation of methods for evalu-

ating the blowability of a sand-clay mixture. Photographs, graphs, tables. (E18)

246-E. Titanium Casting Metallurgy and Production Techniques. D. I. Sinizer and C. M. Adams, Jr. *American Foundryman,* v. 27, June 1955, p. 85-89.

Control measures for handling liquid titanium, refining and remelting, and skull melting. Gating methods, solidification time, casting furnace and furnace specifications. Graphs, tables, photographs, diagram. (E general, Ti)

247-E. Start Duplex Malleable Control With Raw Materials. Lawrence E. Emergy. *American Foundryman,* v. 27, June 1955, p. 90-95.

Control tips when using malleable pig iron in the duplex melt charge. Micrographs, graphs, tables. (E10, CI)

248-E. Mechanized Shell Molding for Efficient Foundry Production. *Automation,* v. 2, July 1955, p. 73-76.

A process where a mixture of sand, wetting agent and thermosetting phenolic resin is brought into contact with a heated pattern to produce a thin, tough and gasporous shell mold. Diagram, photographs. (E16)

249-E. Foundry Problems and Principles. G. J. Rogers. *Foundry Trade Journal,* v. 98, May 19, 1955, p. 531-539.

Examples of experiences in foundry work illustrating broad principles and precepts. Photographs, diagrams. (E general)

250-E. Cores and Moulds by the CO_2 Process. A. Talbot. *Foundry Trade Journal,* v. 98, May 26, 1955, p. 559-568.

Comparison of producing castings by conventional practices of dry and green-sand molding and oil-sand coremaking, and by the CO_2 process. Examples and comparative costs. Photographs. (E21, E19)

251-E. Blown Shell Cores, Molds Produced at High Rates. W. G. Patton. *Iron Age,* v. 175, June 16, 1955, p. 92-95.

Machine blows molds and cores at the rate of 240 pieces per hour. Combines electrically heated split patterns or molds, sand resin blowing equipment and a heated mandrel. Photographs. (E19, E21)

252-E. Castability: Its Effect on Alloy Selection. I. Walter A. Dubovick. *Precision Metal Molding,* v. 13, June 1955, p. 44-45, 48-50.

Factors and conditions affecting castability. (To be continued.) (E15)

253-E. (French.) **Electromagnetic Stirring. Application to Desulfurization.** J. Duflot and M. Porcheray. *Revue de metallurgie,* v. 52, no. 4, Apr. 1955, p. 335-347.

Advantages of stirring method include more rapid chemical homogenization and acceleration of desulfurization. Tables, graphs. 3 ref. (E10, C1)

254-E. (German.) **Elastic Chill Mold for Casting Tensile-Test Bars.** K. Wittmoser. *Giesserei,* v. 42, no. 9, Apr. 28, 1955, p. 234-235.

Design of mold which does not exert tensile stress on the test bar. Diagrams, photograph, graph, table. (E11, Q27)

255-E. (German.) **The Use of Carbon-Dioxide Solidification Process in the Production of Cores on the Core Blower.** Winand Jansen. *Giesserei,* v. 42, no. 9, Apr. 28, 1955, p. 236-237.

Sand-binder mixtures, elimination of casting cracks by proper composition of core sands, economy of carbon dioxide solidification process. (E21)

256-E. (German.) **The Behavior of Molding Sand During the Process of Molding and Casting of Gray Iron, and the Testing of Molding-Sand Properties.** Wilhelm Wegener. *Giesserei,* v. 42, no. 10, May 12, 1955, p. 245-254.

Suggestions for a method of determining plasticity of sand; research results on effect of coal-dust additions on the formation of scabs and casting skins. Diagrams, graphs, photographs, micrographs. 21 ref. (To be continued.) (E18)

257-E. (German.) **The Hot-Blast Cupola Furnace in the Steel Mill.** A. Dahlmann. *Giesserei,* v. 42, no. 10, May 12, 1955, p. 258-269.

Advantages and proper operation, effect of melting conditions on carbon content. Graphs. 4 ref. (E10)

258-E. (Hungarian.) **Manufacturing Problems of Large Steel Castings.** Zoltan Nagy. *Ontöde,* v. 6, no. 5, May 1955, p. 107-112.

Problems of shrinkage, formation of stresses and molding materials. Photographs, diagrams. (To be continued.) (E11, ST)

259-E. (Swedish.) **Preventing Gas Absorption From the Mold When Casting Copper Alloys.** Tore Malmberg. *Gjuteriet,* v. 45, no. 4, Apr. 1955, p. 45-50.

Suppressing reaction by using a mold material which will cause rapid solidification of the melt or by spraying a protective metal coating on the mold wall. Diagram, tables. 9 ref. (E19, Cu)

260-E. (Swedish.) **Water Absorption in Dried Cores.** Rolf Morén and Stig Bergman. *Gjuteriet,* v. 45, no. 4, Apr. 1955, p. 51-54.

Development of laboratory method to study water absorption under controlled conditions. Photographs, graphs, tables, diagrams. (E21)

261-E. The Feeding Requirements of Nodular Iron Castings. R. C. Shnay. *Canadian Metals,* v. 18, June 1955, p. 37-38.

Principles of risering, solidification characteristics, feeding distance, minimum riser dimensions. Tables, photograph. 3 ref.
(E23, E22, E25, CI)

262-E. Die Casting in Aluminium. Frank G. Woollard. *Engineers' Digest,* v. 16, May 1955, p. 239-243.

Advantages of die casting over sand casting. Photographs.
(E13, Al)

263-E. Place of Shell Moulding in the Foundry. B H. C. Waters. *Foundry Trade Journal,* v. 98, June 2, 1955, p. 587-596.

The place of shell molding in the foundry and some of the possible competitive processes of shell molding. Techniques of the process. Photographs, diagrams, graphs, micrograph, tables. 8 ref. (E16)

264-E. Aspects of Steel Foundry Practice. H. Hart. *Foundry Trade Journal,* v. 98, June 9, 1955, p. 615-620.

Improvements in riser and gating techniques result in fewer rejects and stronger castings. Photographs, diagrams, graph. 2 ref. (To be continued.) (E22, CI)

265-E. Sand-Resin Cores, Molds Produced Automatically on Versatile Core Blower. W. G. Patton. *Iron Age,* v. 176, July 7, 1955, p. 91-93.

Gas-fired unit yields blown and cured cores of exceptional accuracy. Shell molds can be produced for stack molding and are accurate enough to permit the use of mechanical backup during pouring. Photographs. (E19, E21, E16)

266-E. Casting—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2B-14B.

Developments and prospects in materials and methods of melting, molding and mechanical handling. Photographs. (E general)

267-E. Large Titanium Castings Produced Successfully. R. A. Beall, F. W. Wood and A. H. Roberson. *Journal of Metals,* v. 7, July 1955, p. 801-804.

Conditions for casting metal, size of castings, materials, equipment and deep pool studies. Photographs, diagrams, graph. 7 ref.
(E general, Ti)

268-E. Light Metals Die Casting Outlook and Review. J. C. Fox. *Light Metal Age,* v. 13, June 1955, p. 16-18, 28, 35.

Materials, equipment and methods for die casting aluminum and magnesium. (E13, Al, Mg)

269-E. Aluminium Casting Alloys in Great Britain. F. H. Smith. *Light Metals,* v. 18, June 1955, p. 179-181.

Review of growth of aluminum and aluminum alloy casting methods and casting quality in the past 50 yr. Graphs, tables. 7 ref.
(E general, Al)

270-E. Quality Stainless Castings by Contour Chill Method. Roland E. Groethe. *Materials & Methods,* v. 41, June 1955, p. 110-111.

Application to television tube dies resulted in reduced cost and savings in material. Photographs, table.
(E16, SS)

271-E. Pressure Die-Casting—A Recap. *Metal Industry,* v. 86, May 27, 1955, p. 439-441.

Favorable characteristics, fundamentals of process, qualities of castings, types of machines used. Photographs, diagrams. (To be continued.) (E13)

272-E. The Centenary and the Foundry. A. P. Fenn. *Metal Industry,* v. 86, June 3, 1955, p. 460-463.

Progress of the aluminum foundry industry and highlights of important stages in development of the art of production of aluminum castings. Photographs. (E general, Al)

273-E. Factors Influencing the Chilling of Cast Iron. W. J. Williams. *Metallurgia,* v. 51, no. 308, June 1955, p. 273-279.

Effects of chemical composition, nature of the charge, melting conditions, and inoculation on graphitization of gray iron. Diagram, photographs, micrographs, tables. 7 ref.
(E25, CI)

274-E. Castability: Its Effect on Alloy Selection. II. Walter A. Dubovick. *Precision Metal Molding,* v. 13, July 1955, p. 40-43, 69-71.

Grading of materials according to castability with ratings from excellent to poor and a comparison of investment casting with wrought materials. (E15)

275-E. The Waterglass-Carbon Dioxide Molding Process for Gray-Iron Foundries. O. Gerstmann and E. Grohmann. *Henry Brutcher Translation No.* 3514, 7 p. (Abridged from *Giessereitechnik,* v. 1, no. 2, 1955, p.

16-17.) Henry Brutcher, Altadena, Calif.

How the process should be employed in a gray cast iron foundry. Diagrams, photograph, table. (E21, CI)

276-E. (Czech.) **Foundry Properties of Spheroidal Cast Iron.** Vaclav Oliverius. *Slévarenstvi,* v. 3, no. 5, May 1955, p. 130-133.

Properties, especially fluidity, and linear and volume contraction, molding techniques of spheroidal cast iron. Tables, graphs, photographs. 4 ref. (E25, CI)

277-E. (Czech.) **Fast Measurement of Mold Face and Core Moisture Content After Drying.** Miroslav Houst'. *Slévarenstvi,* v. 3, no. 5, May 1955, p. 135-138.

Determined by measurement of electric conductivity, using a simple inexpensive apparatus. Photographs, diagrams, tables, graphs. 4 ref. (E19)

278-E. (Czech.) **Casting of Complicated Tools.** Otakar Moravek. *Slévarenstvi,* v. 3, no. 5, May 1955, p. 138-141.

Possibilities of using lost wax precision casting for production of complicated tools. Most favorable conditions for production of molds for wax patterns as well as wax mixtures. Photographs. 4 ref. (E15, TS)

279-E. (Czech.) **Corner Connection of Core Boxes.** Vit Toman and Josef Grguric. *Slévarenstvi,* v. 3, no. 5, May 1955, p. 141-142.

To reduce wood consumption, Czechoslovakian foundries use two methods of corner connections—hinge connections, with screw drawing, and eccentric locking. Diagrams, photographs. 4 ref. (E21)

280-E. (Italian.) **Lost-Wax Casting Process.** W. H. Sulzer. *Fonderia,* v. 4, no. 4, Apr. 1955, p. 137-144.

Survey of latest improvements in method; materials, other than wax, for the patterns and casting procedure. Metals and alloys for casting, mechanical properties, purposes for which used, weldability. Photographs, tables, diagrams. (E15, Q general, K9)

281-E. Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 34, June 1955, p. 132-133.

Advantages and disadvantages of cupola melting and some factors in the making of cast steel. Table, diagram. (To be continued.) (E10, CI)

282-E. Spinning Cylinder Sleeves at Perfect Circle. Kenneth L. Mountain. *Foundry,* v. 83, July 1955, p. 108-114.

Development of a method for centrifugally casting cylinder sleeves. Cooling problem, cupola charge, automatic spraying of coating, flexibility in size of castings. Photographs, micrograph. (E14, CI)

283-E. Better Castings With Less Metal. A. J. Stone, H. B. Kinnear and A. R. Fraser. *Foundry,* v. 83, July 1955, p. 118-121.

Use of rapidly igniting exothermic compounds on open risers of castings and on hot tops of ingots to eliminate excessive piping and shrink cavities caused by premature freezing of the feeding metal. Discusses delaying of skin formation on top surface of the riser, feeding a bronze casting, and their application to aluminum. Photographs. (E23, D9, AY, CI, Cu, Al)

284-E. Centrifugal Casting With a German, Water-Cooled Machine. P. J. Ahern and J. F. Wallace. *Foundry,* v. 83, July 1955, p. 130-135.

Design and operation of a German centrifugal casting machine used for large-scale gun tube manufacture and a comparison with its counterpart in the U.S.A. Photographs, micrographs, diagrams. 6 ref. (E14)

285-E. Aspects of Steelfoundry Practice. H. Hart. *Foundry Trade Journal,* v. 98, June 16, 1955, p. 645-653.

Atmospheric cores, partial mold reversal during casting, dry sand molding, scabbing of molds and cores, porosity and fireclay runner sleeves. Diagrams, photographs, graph, table. 8 ref. (E11)

286-E. Influence of Grain Size on Structure, Pressure-Tightness and Tensile Properties of Sand-Cast Bronzes and Gunmetals. A. Cibula. *Foundry Trade Journal,* v. 98, June 30, 1955, p. 713-726.

It is concluded that the mode of solidification varies considerably with pouring conditions. Solidification in alloys cast at high temperatures, without a grain refiner, proceeds largely by skin-growth; with grain refiners or casting at low temperature, equiaxial grains are nucleated throughout and "pasty" solidification occurs. Diagrams, graphs, micrographs, tables, photographs. 26 ref. (E11, E25, Cu)

287-E. Direct Chill Casting of Light Metal Billets. Herbert Capitaine. *Metal Industry,* v. 87, July 1, 1955, p. 9-11.

A consideration of the processes of pretreatment of the melt which affect the quality of the cast billets and discussion of means where-

by sound billets and rolling slabs can be produced. Diagrams, tables. 4 ref. (E16, C5, Al)

288-E. (French.) **Binding Agents for Self-Drying Cores.** Pierre Nicolas. *Fonderie,* 1955, no. 111, Apr., p. 4474-4482.

Factors influencing hardening of the self-drying sand and difficulties in using this sand. Graphs. (E18)

289-E. (German.) **Effect of the Metallurgical Properties of the Steel-Mold Casting on the Tendency to Hot Cracking.** Hans Heyer and Eugen Piwowarsky. *Giesserei,* v. 42, no. 11, May 26, 1955, p. 273-279.

Device for testing the effects of casting temperature, grain size, and carbon, phosphorus and sulfur contents on susceptibility to hot cracking; test results. Micrographs, graphs, diagrams, photographs, tables. (E12, CI)

290-E. (German.) **The Behavior of Molding Sand During the Molding and Casting Process of Cast Iron and the Testing of Molding-Sand Properties.** Wilhelm Wegener. *Giesserei,* v. 42, no. 11, May 26, 1955, p. 280-285.

Effect of water and coal dust content on the gas permeability of sand molds; suggestions for the continuous control of sand molds, especially with respect to proper grain size and type of coal dust. Graphs, tables, micrographs. (E18, CI)

291-E. (German.) **Temperatures of the Acid Refractory Linings of Small Converters.** W. Bading. *Giesserei,* v. 42, no. 11, May 26, 1955, p. 288-290.

Rate of temperature rise and changes, average temperatures at different points of the converter lining. Diagrams, graphs, table. 9 ref. (E10, CI)

292-E. (German.) **Working With the Hot-Blast Cupola Furnace.** Willi Haas. *Giesserei,* v. 42, no. 11, May 26, 1955, p. 291-292.

Principles of operating, charging and servicing. Tables. (E10, CI)

293-E. (German.) **Progress in the Construction of Recuperators for Hot-Blast Cupola Furnaces.** Alfred Schack. *Giesserei,* v. 42, no. 12, June 9, 1955, p. 302-307.

Different types of modern recuperators. Diagrams, photographs. 5 ref. (E10)

294-E. (Hungarian.) **The Role of Ammonium Bifluoride in Magnesium Casting.** Gyula Emöd and Pal Németh. *Ontöde,* v. 6, no. 6, June 1955, p. 127-131.

Experiments and results on substituting ammonium bifluoride for boric acid and sulfur during the sand casting of magnesium and its alloys. Table, photographs. 6 ref. (E11, Mg)

295-E. (Polish.) **Precision Casting by Lost Wax Method.** H. Zakowa. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 148-151.

Techniques used in preparation of patterns and molds for precision casting with reference to raw materials and equipment required. Precision casting of cutting tools and economic advantages obtained by application of this method. Photographs, micrograph. 14 ref. (E15)

296-E. (Portuguese.) **"Wet Sands" Used in "Casting Sands".** Carlos Dias Brosch. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 37, Oct. 1954, p. 363-380.

Preparation and properties of molding-sand mixtures having high moisture contents. Graphs, tables. (E18)

297-E. (Russian.) **Peculiarities in the Production of Heat-Resistant Castings.** V. P. Desnitskii. *Liteinoe Proizvodstvo,* 1955, no. 6, June, p. 1-4.

Main defects in austenitic steel castings; influence of steel composition versus method of casting; new method of casting which eliminates most of the defects. Drawings, micrographs. 5 ref. (E general, CI)

298-E. (Russian.) **Casting the Body of the Turbine Wheel for the Kuibyshev Hydroelectric Plant.** N. D. Vasil'ev. *Liteinoe Proizvodstvo,* 1955, no. 6, June, p. 4-9.

Technique of mold preparation and casting, using over 110 tons of liquid metal. Graph, photographs, tables, diagrams. 1 ref. (E19)

299-E. (Russian.) **Mechanization of the Lost Wax Casting Method.** A. V. Baranov, V. N. Ivanov, and N. M. Osokin. *Liteinoe Proizvodstvo,* 1955, no. 6, June, p. 9-15.

Design of machines for mixing wax; ovens for melting-out the investment. Diagrams. (E15)

300-E. (Slovenian.) **Clay as a Binder in Synthetic Molding Mixtures.** Ciril Pelhan. *Rudarsko-metalurski zbornik,* 1954, nos. 3-4, p. 259-273.

Use of semisynthetic and synthetic sands and various binders; mineralogical composition and physical properties of clays. Tables, diagrams. 6 ref. (E18)

301-E. (Swedish.) **Automatic Molding Machines.** J. Broberg, L. B. Lindh and K. Akesson. *Gjuteriet,* v. 45, no. 5, May 1955, p. 61-65.

General views on automatic mold-

ing, considering patterns, molding materials, transport of flasks and mold parts and maintenance of the machines. Descriptions of some Swedish automatic molding machines. Photographs, diagrams. (E19)

302-E. **Brass Foundry Modernization Raises Plant Efficiency.** Edwin A. Swensson and James F. Gallagher. *Foundry,* v. 83, Aug. 1955, p. 86-89.
Through mechanization a foundry meets demands for lower-cost castings and higher production rates. Photographs, tables. (E general, Cu)

303-E. **New Centrifugal Process Uses Sand-Resin Lining.** Edwin Bremer. *Foundry,* v. 83, Aug. 1955, p. 90-93.
Process which combines advantages of the steel mold and metal flask with rammed sand lining methods of casting. Photographs. (E14, CI)

304-E. **Water-Cooled Cupola Brightens Future for Consistent Control of Castings.** Leonard H. Wisner. *Western Metals,* v. 13, July 1955, p. 52-54.
Description, operation and advantages of melting unit capable of positive control of the refining action and producing a superior quality metal for Meehanite castings. Photographs, diagram, table. (E10, CI)

305-E. **The Brass Foundry.** Harry St. John. *Foundry,* v. 83, Aug. 1955, p. 94-97.
How casting costs can be cut and quality improved through the possibilities inherent in these four elements: men, machines, metal and sand. Photographs. (E11, Cu)

306-E. **Mechanizing a Small Foundry.** William G. Gude. *Foundry,* v. 83, Aug. 1955, p. 98-100.
Description of a small modern foundry with a high degree of mechanization in all phases of the work. Photographs, diagram. (E general)

307-E. **Huge Castings Required for Heavy Forging Presses.** *Foundry,* v. 83, Aug. 1955, p. 101-103.
Production of large castings used in the construction of heavy forging presses. Photographs. (E11, T5, CI)

308-E. **So You Are Going to Try Shell Molding?** John G. Steinebach. *Foundry,* v. 83, Aug. 1955, p. 104-107.
Practical advice and operational hints for foundries which are contemplating installation of shell molding operation. Photographs. (E16)

309-E. **A New Role for Pattern Shops.** Al Brocklebank and William J. Sikula. *Foundry,* v. 83, Aug. 1955, p. 108-109.
Role of patternmaker as a design consultant on foundry techniques and as a go-between from the designer and foundry. Diagrams, photographs. (E17)

310-E. **Making Precision Castings in Glass Molds.** *Foundry,* v. 83, Aug. 1955, p. 140, 142-143.
Results of tests using this method for the production of jet engine buckets and vanes show that 90% of the castings met precision standards on surface finish. Photographs. (E19)

311-E. **Metal and Mould Research on Steel Castings. I. Solidification Mechanism.** J. A. Reynolds and A. Preece. *Foundry Trade Journal,* v. 99, July 14, 1955, p. 31-38.
Problems of shrinkage unsoundness and an analysis of experiments to establish directional solidification and control; relationship between microporosity, crystal structure and tensile properties; effect of various phenomena on tensile and other physical properties. Photographs, micrographs, diagrams, graph. 9 ref. (To be continued.) (E25, Q23, M27, CI)

312-E. **Formation of Shrinkage Defects in Grey Iron Castings.** J. Gittus. *Iron & Steel,* v. 28, July 1955, p. 331-335.
Castings made in dried sand molds are sounder than those made in green sand, which is attributed to the higher ridigity of the dry mold, with the result that the size of a pipe in the casting is reduced by expansion of the sand and by that of the solidifying eutectic. Photographs, diagrams, graphs. (To be continued.) (E25, CI)

313-E. **Metal Handling for Diecasting.** H. K. Barton. *Mechanical World and Engineering Record,* v. 135, July 1955, p. 312-314.
Recent advances in automatic transfer methods. Diagrams, photographs. (E13, A5)

314-E. **Induction Furnace Linings.** Herbert Capitaine. *Metal Industry,* v. 87, July 15, 1955, p. 45-46.
Preparation of refractories for light alloys used in furnaces having capacities of over two tons. Graph. 1 ref. (E10, Al)

315-E. **The Melting and Casting of Beryllium.** P. Corzine and A. R. Kaufmann. Paper from "The Metal Beryllium". American Society for Metals, p. 136-151.
Crucible and mold materials, protective atmospheres; melting equipment; casting defects and struc-

tures; centrifugal casting; refining effects of vacuum melting; comparison of cast beryllium with other forms. Diagrams, photographs. 5 ref. (E general, Be)

316-E. Some Factors Affecting Fluidity of Metals. D. V. Ragone, C. M. Adams and H. F. Taylor. Paper from "The 1955 Heat Transfer and Fluid Mechanics Institute". University of California. 33 p.

Equations derived relating fluidity of pure metals to metal properties and test variables. Fluidity was found to vary directly with channel diameter, volumetric heat of fusion, applied pressure head and superheat, but varied inversely with friction factor, temperature difference between metal and mold and heat-absorbing ability of the mold. Change in viscosity had but a small effect. Graphs, diagrams, tables. 46 ref. (E25)

317-E. (English.) **Solidification of Sand Castings.** Gora Ohira. *Technology Reports, Tohoku University,* v. 19, no. 2, 1955, p. 201-223.

Measurement of temperature in the metal and in the mold provides a versatile technique for analyzing the solidification mechanism. Investigates position and optimum size of the riser and its effect on casting. Tables, diagrams, graphs. 9 ref. (E25, Al)

318-E. (German.) **Characteristic Properties of Alloys for Pressure Casting.** Gustav Lieby. *Giesserei,* v. 42, no. 14, July 7, 1955, p. 357-361.

Solidification of alloys in pressure casting, basic properties of alloy used, physical and mechanical properties of finished product. Photograph, graphs, tables, diagrams, micrographs. 1 ref.
(E13, E25, Q general, P general)

319-E. (German.) **Smelting and Heat Crackability of Hard Manganese Cast Steel.** F. C. Althof, *Giesserei,* v. 42, no. 14, July 7, 1955, p. 362-370.

Melting procedure, influence of composition of mold material on hot cracking, mechanism of crack formation and method of prevention. Photographs, micrographs, tables, graphs, diagrams. 29 ref.
(E10, E25, CI)

320-E. (Polish.) **Research on the Use of Magnesium Ferrosilicon Alloys and "Electron" Alloy Scrap for the Production of Cupola Nodular Iron.** Jerzy Piaskowski. *Przeglad Odlewnictwa,* v. 4, no. 5, May 1954, p. 132-138.

Experiments show that their copper and aluminum content have little effect on strength properties of the iron; results improved with lower magnesium content and through normalizing. Micrographs, tables. (E25,Q general, CI)

321-E. (Polish.) **Capacity Drying of Foundry Cores.** Tadeusz Skrzypek. *Przeglad Odlewnictwa,* v. 4, nos. 7-8, July-Aug. 1954, p. 219-224.

Core materials, physico-chemical and thermal phenomena during drying, drying kilns, operations and design economy. Graphs, tables, photographs, diagrams. 9 ref. (E21)

322-E. (Swedish.) **Mold Reaction in Nonferrous Metal Castings.** W. A. Baker. *Gjuteriet,* v. 45, no. 6, June 1955, p. 75-81.

Gas absorption in nonferrous casting alloys, reaction mechanisms, effects of gas absorption by mold reaction on the properties of castings. Tables, diagrams, photographs, graphs. 8 ref. (E19, EG-a)

323-E. Some Aspects of Shell-Moulding Technique. D. F. Bailey. *Institute of British Foundrymen, Proceedings,* v. 47, 1954, p. 250A-256A.

Shell making materials, mixtures, and methods; causes and remedies for mold failures. Table, graphs, photographs. (E16)

324-E. Quantity Production of Engineering Castings. J. Burrell. *Institute of British Foundrymen, Proceedings,* v. 47, 1954, p. 1B-14B.

Changes in plant layout and production methods necessitated by increase in nature of production from jobbing to mass production of tractor parts. (E general, CI)

325-E. Operating Experiences With Hot-Blast Cupolas in Great Britain. F. C. Evans. *Institute of British Foundrymen, Proceedings,* v. 47, 1954, p. 56B-65B; disc., p. 65

Progress report to show what results have been obtained, so far, using British fuels and raw materials and operating under British conditions. Diagrams, graphs, photograph, table. (E10, CI)

326-E. Carbon and Alloy Steel Castings. *Iron & Steel,* v. 28, June 1955, p. 291-295.

Different aspects of technical control exercised by the metallurgical, methods and maintenance departments. Examples of production in the medium, heavy, and induction divisions. Diagrams, photographs, table. (E11, CN, AY)

327-E. Moulding Powder Filler From Jute Sticks. P. K. Ghosh, T. Bhowmik and P. K. Bose. *Journal of Scientific & Industrial Research,* v. 14, sec. B, Mar. 1955, p. 121-123.

Use of wood flour, made from

jute sticks after removal of fiber, as a filler in molding powders. Tables. 4 ref. (E19)

328-E. Pressure Die Casting at the Works of the Wolverhampton Die Casting Co. Ltd. *Machinery (London),* v. 87, July 29, 1955, p. 253-261.

Equipment and operating techniques. Photographs. (E13, Zn)

329-E. Economical Production of Foundry Molds by the Carbon Dioxide Process. W. Saubermann. *Henry Brutcher Translation No.* 3528, 8 p. (Abridged from *Giesserei-Praxis,* v. 73, no. 7, 1955, p. 130-132.) Henry Brutcher, Altadena, Calif.

Proposed highly mechanized mold making process and machine; possibility of working the carbon dioxide process into fully mechanized foundry practice. Principles of mold making machine; extension of its scope by fitting different blowing or ramming heads. (E19)

330-E. On the Application of the Carbon Dioxide Process (by Schmidt and Philipp) in Light-Metal Foundries. *Henry Brutcher Translation No.* 3529, 5 p. (From *Giesserei-Praxis,* v. 72, no. 7, 1954, p. 117-118.) Henry Brutcher, Altadena, Calif.

Practical application of the process for aluminum and magnesium castings; time saving factors in making different types of cores and molds of extremely complicated shape. (E19, E21, Al, Mg)

331-E. (Czech.) **Pouring of Heavy Steel Castings in Chemically Hardened Sand Molds.** Vaclav Lupac and Karel Pluhar. *Slévarenstvi,* v. 3, no. 6, June 1955, p. 161-163.

Production experience; advantages of carbon dioxide hardening process. Graphs, photographs. (E19, E21, E23, CI)

332-E. (Czech.) **Alloying of Cast Iron in Cupola by Means of Slags.** Bretislav Sochor. *Slévarenstvi,* v. 3, no. 6, June 1955, p. 169-172.

Titanium and boron pass from slags into cast iron, producing the same results as is obtained by addition of the corresponding ferroalloys. Micrographs, spectrograms. (E10, B22, CI)

333-E. (Dutch.) **Mold Reaction of 90/10 Aluminum-Magnesium Alloy.** H. Boswinkel. *Metalen,* v. 10, no. 12, June 30, 1955, p. 237-240.

Definition of mold reaction; boric acid and beryllium as inhibitors; influence of sodium and beryllium inhibitors on the alloy properties. Table, graphs. 8 ref. (E19, Al, Mg)

334-E. (Pamphlet.) **Foundry Manual for Sand Casting Aluminum-10 Per Cent Magnesium Alloy.** P. D. Frost. PB 111577. 122 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $3.25.

Contains sections on melting, gating and risering, hot and cold cracking, and properties of sand. (E11, Al)

335-E. (Book.) **Institute of British Foundrymen, Proceedings, (Annual Volume),** v. 47, 1954, 396 p. Institute of British Foundrymen, Saint John Street Chambers, Deansgate, Manchester, 3, England.

Consists of 30 papers presented to the Annual General Meeting of the Institute and a selection of the Papers presented to branch meetings. Most papers have been previously abstracted as preprints or as published in *Foundry Trade Journal.* The remaining papers are abstracted separately. (E general)

336-E. On Various Theories of Globular Graphite Formation in Cast Iron. Ichiro Iitaka. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 1-5.

Critical review and comparison of surface tension, supersaturation, and other theories. Diagrams. 22 ref. (E10, E25, CI)

337-E. The Effect of Inoculation in Nodular Cast Iron. Ichiro Iitaka and Kokichi Nakamura. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 9-11.

Effects of variation in inoculating time and interval on microstructure. Micrographs. 4 ref. (E25, M27, CI)

338-E. The Effects of Mo, Ni:Mo and Cu:Mo Additions on the Matrix of Spheroidal Graphite Cast Iron. Takaji Kusakawa. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 15-20.

Effects of melt additives on microstructure and hardness. Tables, graphs, micrographs. (E25, M27, Q29, CI)

339-E. Method to Determine the Semblance of a Molding Sand Grain. Jiro Kashima. *Casting Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 31-37.

Procedure for measuring specific surface area of sands, using ethylene glycol or glycerine. Tables, graphs, diagram. (E18)

340-E. Long-Length and Bi-Metal Centrifugal Castings. *Engineering,* v. 180, July 22, 1955, p. 112-113.

Controlled coatings on metal

molds, mold preparation, casting and stripping methods. Photographs. (E14, Fe, ST)

341-E. Metal and Mould Research on Steel Castings. II. Mould and Core-Bonding Agents. J. M. Middleton and J. White. *Foundry Trade Journal,* v. 99, July 21, 1955, p. 59-70, 82.

Bonding properties and a "life" index of numerous bentonites and several British kaolinitic clays show that mixtures have certain advantages. Dielectric-cured and oven-baked resin-bonded cores evaluated. Hot tearing in steel castings related to extent of ramming. Tables, graphs, diagram, photographs. 6 ref. (E18, E21, ST)

342-E. Evaluation of Casting Processes. Hiram Brown. *Foundry Trade Journal,* v. 99, July 28, 1955, p. 85-92.

Superiority of castings for many applications, advantages and limitations of the various foundry methods. Photographs. 4 ref. (E general, T general)

343-E. Precision Casting Simplifies Production of Stainless Pump Impeller. Eric Anderson and E. H. Parris. *Iron Age,* v. 176, Aug. 18, 1955, p. 87-89.

Step-by-step description of process which avoids prohibitive machining costs. Photographs. (E15, G17, SS)

344-E. Formation of Shrinkage Defects in Grey Iron Castings. J. Gittus. *Iron & Steel,* v. 28, Aug. 1955, p. 387-390.

Formation of cavities in gray iron castings; effects of silicon, phosphorus and carbon; influence of type of mold. Graphs, diagrams, photographs. 1 ref. (E25, CI)

345-E. Pressure Die-Casting—A Recap. *Metal Industry,* v. 87, July 22, 1955, p. 71-72.

Costs and economics of die casting processes, difficulties of limited production. Diagrams, photographs. (E13)

346-E. They're Making Molds Out of Glass Now. Richard M. Smith and Nicholas J. Grant. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 30-32.

Process uses ceramic slip of crushed, almost pure silica glass to make shell molds for exceptionally smooth castings. Diagram, photographs. (E16)

347-E. How to Bake Cores Without Heat. Waldemar Schumacher. *Modern Castings and American Foundryman,* v. 28, July 1955, p. 32-35.

Carbon dioxide blown through a water glass-sand mixture will bond them in minutes. Process details. Photographs, graphs. (E21)

348-E. Casting High Quality Magnesium. H. E. Elliott. *Modern Castings and American Foundryman,* v. 28, July 1955, p. 38-44.

Look at every phase of production and testing for better magnesium foundry practice. Photographs. (E general, Mg)

349-E. The Case of the Absorbed Oxygen. Robert C. Williams and Harold W. Lownie, Jr. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 58-59.

Results of recent discovery explaining why castings contain more oxygen than expected. Points out significance of the time elapsed between casting and analyzing the iron. Photograph, graph. 3 ref. (E25, S11, CI)

350-E. Smooth That Alligator Skin. Burdette Jones. *Modern Castings and American Foundryman,* v. 28, July 1955, p. 82-84.

Proper amount of foundry sand additives and binders results in smoother casting finish. Photographs. (E18)

351-E. Molding Materials, Methods and Machines. R. W. Heine and P. C. Rosenthal. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 39-54.

Advances in and evaluation of processes in methods, equipment and materials of molding. Photographs, tables, diagrams. (E19)

352-E. New Sugar Formula Makes Sweet Core Binder. Charles J. Gogek. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 55-57.

Results of laboratory tests and a brief discusssion of foundry trials. Photographs, tables, graphs. (E21)

353-E. Bronze Die Castings by Vacuum. *Precision Metal Molding,* v. 13, Aug. 1955, p. 34-36, 75.

Principle, advantages, alloys applicable to the process, design freedom. Table, diagram, photographs. (E13, Cu)

354-E. (Czech.) **Castings Produced by Shell Molding.** Lev Petrzela. *Slévarenstvi,* v. 3, no. 7, July 1955, p. 196-202.

Production methods, including

molding techniques and testing. Photograph, diagrams, graphs. (E16)

355-E. (German.) **The Metallurgy of a High-Test Cast Iron With Compact to Spherical Graphite Structure.** Eugen Piwowarsky and Ernst-Günter Nickel. *Giesserei,* v. 42, no. 15, July 21, 1955, p. 385-392.

Production of high-strength cast iron by superheating, methods of deoxidizing, degassing and melting in basic-lined furnaces. Tables, micrographs, diagram, graph. 8 ref. (E10, E25, CI)

356-E. (Italian.) **Production of Cast Iron With Nodular Graphite.** R. Zoia and A. Masi. *Fonderia,* v. 4, no. 5, May 1955, p. 215-219.

Production and composition of nodular graphite cast iron. Table, graph, micrographs. 12 ref. (E25, CI)

357-E. (Italian.) **Functional Curve of a Cupola Furnace.** J. N. Alcacer and J. A. J. de Andrés. *Fonderia,* v. 4, no. 6, June 1955, p. 249-253.

Theory of operation. Diagrams, tables, graphs. 4 ref. (E10)

358-E. Shell Moulding Gains Over Sand. *Canadian Metals,* v. 18, Aug. 1955, p. 33-34, 36.

Process of coating hot pattern with resin bonded sand in a dump box shows promising economies in production. Photographs. (E16)

359-E. Production Layout for the Small Jobbing Foundry. Frank Hudson. *Canadian Metals,* v. 18, Aug. 1955, p. 38-40.

Economies of production in the small jobbing foundry which can cut costs without heavy expense of new equipment. Photographs. (E general)

360-E. Chevrolet Tonawanda Foundry. *Foundry,* v. 83, Sept. 1955, p. 112-142.

Photographic tour of 280,000-sq.ft. plant covering sand storage, coremaking, molding, melting, cleaning, patternmaking and maintenance shops. Photographs, plans. (E general, A5, CI)

361-E. Automatic Casting of Aluminum Employs Continuous Melting. Jack C. Miske. *Foundry,* v. 83, Sept. 1955, p. 143-147.

New type of furnace can be heated up in less than 3 hr., melts ingots in 24 to 30 min., and provides continuous supply of metal. Diagram, photographs. (E10, Al)

362-E. Selecting Ingot and Scrap in the Brass Foundry. Harry St. John. *Foundry,* v. 83, Sept. 1955, p. 154-157.

Economies of maintianing a clean plant means recovery and utilization of high-quality scrap. Table, diagram, photograph. (To be continued.) (E general, A8, Cu)

363-E. Production and Quality Raised by Automated Sand System. I. H. Richardson. *Foundry,* v. 83, Sept. 1955, p. 158-161.

Automated sand formulation, processing, handling and distributing system resulted in upgrading of castings. Diagram, photographs. (E18)

364-E. Behaviour of Moulding Sands at High Temperatures. W. B. Parkes and R. G. Godding. *Foundry Trade Journal,* v. 99, Aug. 11, 1955, p. 139-149.

Measurements of stress-strain properties and brittleness of sand on heating to 2000° C. in approximately 2 min. Diagrams, graphs, photographs, table. 10 ref. (E18)

365-E. Quantity Production of Magnesium Castings. W. J. Sully. *Metal Industry,* v. 87, Aug. 12, 1955, p. 125-127.

Use of magnesium alloy in casting of tractor transmission cases. Tables, photographs. (E11, T21, Mg)

366-E. Sodium Waterglass as a Binder for Foundry Molds. A. Potocki. *Henry Brutcher Translation No.* 3455, 4 p. (Abstract from *Przeglad Odlewnictwa,* 1953, no. 7, p. 13-14.) Henry Brutcher, Altadena, Calif.

Laboratory and semiproduction experiments in steel-casting foundry. Three forms of hardening were tried: short period baking in an electric oven without air circulation; action of an atmosphere of carbon dioxide in an open vessel; injection of carbon dioxide from a gas bottle. 1 ref. (E19, CI)

367-E. (German.) **Melting Chips in the Cupola Furnace According to the Crofts Process.** S. H. Chrobok. *Giesserei,* v. 42, no. 16, Aug. 4, 1955, p. 409-412.

Economy, method of charging and conditions of melting cast iron, steel and malleable iron chips in the cupola furnace; carbon, sulfur, silicon and manganese analysis of melts made with and without chips indicate no significant effect of chips on the composition of a casting. Tables, photographs, diagram. 2 ref. (E10, CI, ST)

368-E. (German.) **The Metallurgy of a High-Test Cast Iron With Compact**

to Spheroid Graphite Structure. Eugen Piwowarsky and Ernst-Günter Nickel. *Giesserei,* v. 42, no. 16, Aug. 4, 1955, p. 412-419.

Mechanical properties of gray iron are increased by reducing the gas content of a melt to a minimum. Effect of basic and acid melting and of superheating beyond 1600° C.; strength properties resulting from treating melts with scavenging gas and high-vacuum melting; effect of fluoride mixtures on graphite structure. Micrographs, tables, diagram, graph, photograph. 30 ref. (E25, M27, CI)

369-E. (German.) **The Combustion Process in the Cupola Furnace.** Wolfgang von Preen. *Giesserei,* v. 42, no. 16, Aug. 4, 1955, p. 419-420.

Experimental studies on the combustion of coke to form carbon monoxide before forming carbon dioxide and reduction of carbon dioxide due to insufficiency of oxygen. 8 ref. (E10)

370-E. (German.) **Mutual Effect Between Steel and the Mold.** Werner Trommer. *Giesserei,* v. 42, no. 17, Aug. 18, 1955, p. 433-440.

Effect of drying and temperature rates on compression strength of molding sands. Effect of type, grain size distribution and properties of molding sand and gas permeability of mold on shell formation on casting, fusion of casting to mold, formation of sand spots, composition of steel, condition of casting. Graphs, photographs, diagrams, micrograph. 34 ref. (E18, E19, CI)

371-E. (Russian.) **Particularities of the Production of Thin Wall Chill Mold Castings.** A. M. Petrichenko. *Liteinoe Proizvodstvo,* 1955, no. 7, July, p. 4-8.

Particularities of crystallization. Construction of chill molds; pouring installation. Diagrams, graphs, tables, micrographs. 5 ref. (E25, CI)

372-E. (Russian.) **Changes in Chemical Composition and Temperature of Metal During Oxygen Blowing Through Cast Iron in the Forehearth of a Cupola Furnace.** N. A. Voronova and O. A. Trigub. *Liteinoe Proizvodstvo,* 1955, no. 7, July, p. 17-20.

Effects of operating conditions on composition. Tables, graphs. 6 ref. (E10, CI)

373-E. Metal Melting Furnaces. F. C. Evans. *Foundry Trade Journal,* v. 99, Aug. 18, 1955, p. 177-178; disc., p. 178-180.

Metallurgical, economic and practical aspects based on fuel characteristics. Table, diagrams. (E10, B18)

374-E. Chill Testing. A. P. Alexander. *Foundry Trade Journal,* v. 99, Aug. 18, 1955, p. 181-182.

This rapid means for determining carbide stability of cast iron is used to check on melting operations and to control the structure of the castings. Table, graph. (E25, CI)

375-E. The Foundry Industry in Australia. A. W. Silvester. *Foundry Trade Journal,* v. 99, Aug. 25, 1955, p. 203-210.

Available molding sands, refractories and fluxes, types of foundries, production and capacity, equipment and control, molding practices, research and development and the future of Australia's secondary industry. Tables, photographs. 5 ref. (E general, A4)

376-E. Radiant Heat Furnace Feeds Metal Molds. John J. Keating. *Modern Castings and American Foundryman,* v. 28, Sept. 1955, p. 30-31.

Advantages of continuous melting method include better quality, reduction of wasteful heating and solution to summer problems. Photographs, diagram. (E10, Al)

377-E. Make Small Risers Do the Work of Large. William A. Mader. *Modern Castings and American Foundryman,* v. 28, Sept. 1955, p. 32-35.

Insulating and exothermic risering and padding materials can give higher yield and better quality in sand casting of aluminum. Photographs, table, graph. 10 ref. (E22, Al)

378-E. Core Room Pitfalls. Robert H. Greenlee. *Modern Castings and American Foundryman,* v. 28, Sept. 1955, p. 36-37.

Problems in producing cores that aid in making better castings and not merely overcoming core room problems. Photographs. (E21)

379-E. What You Should Know About Forehearth Refractories. Ralph Carlson and Sam F. Carter. *Modern Castings and American Foundryman,* v. 28, Sept. 1955, p. 56-60.

Use of clay plastic containing graphite has proven most suitable for forehearth soda ash desulfurizing of gray iron. Photographs, tables, diagrams. (E10, CI)

380-E. Investment Casting of Carbon Steels. Howard Derow. *Steel,* v. 137, Aug. 22, 1955, p. 70-71.

Castability, surface decarburization, heat treatment, grain size, ma-

chining and hardness of investment castings. Photographs. (E15, CI)

381-E. (German.) **Determination of the Volume of Blast Actually Supplied to a Cupola Furnace.** Alois Dahlmann. *Giesserei,* v. 42, no. 17, Aug. 18, 1955, p. 440-442.
Methods of converting volume of blast to standard conditions and computing consumption and losses of blast in the furnace. Graphs. (E10)

382-E. It Is Not All Sand! C. A. Sanders and Nathan Levinsohn. *American Foundrymen's Society, Preprint No.* 55-101, 1955, 5 p. (TS200 Am 35t)
Pictorial article defends sand, and accuses "human variable" for casting defects. Photographs. (E11)

383-E. An Example of Work Simplification in Fettling Operations. F. C. Pearce. *British Cast Iron Research Association. Journal of Research and Development,* v. 6, Aug. 1955, p. 16-18 + 4 plates; disc., p. 18-19.
Economies result from removing fettling operation and collecting scrap during machining. Photographs, graph, diagram. (E general, G17, A5, CI)

384-E. The Expansion of Moulding Sand With Increase of Temperature. R. G. Godding. *British Cast Iron Research Association. Journal of Research and Development,* v. 6, Aug. 1955, p. 23-29.
Effect of moisture content, degree of ramming and various additions on the expansion of natural and synthetic molding sand with increase in temperature. Graphs. 3 ref. (E18, CI)

385-E. High Temperature Properties of Sands Containing Coal Dust and Woodflour. R. G. Godding. *British Cast Iron Research Association. Journal of Research and Development,* v. 6, Aug. 1955, p. 30-35.
Relationship between strength and temperature of a synthetic sand shown with two rates of heating. Graphs. 7 ref. (E18, CI)

386-E. Re-Lining Shaft Bearings With Anti-Friction Alloys. W. M. Halliday. *Canadian Metals,* v. 18, Sept. 1955, p. 37-38.
Care must be taken to use appropriate equipment and proper methods of pouring to avoid extra cost and serious accidents. (E23, SG-c)

387-E. Foundry Practice. IX. The Molten Metal. William H. Salmon and Eric N. Simons. *Edgar Allen News,* v. 34, Sept. 1955, p. 207-208.
Continues discussion of molten metal and begins section on fettling operations. (To be continued.) (E23)

388-E. Metal Oxide Sealer Effectively Impregnates Castings. W. J. Grassby. *Iron Age,* v. 176, Sept. 15, 1955, p. 135-137.
A fast-acting sealer teamed with high-speed wash-drier unit enables aluminum die castings to be impregnated at rates up to 600 per hr. and to withstand pressure to 2100 psi. without leakage. Photographs. (E13, Al)

389-E. Hot Blast Cupolas. A Review of Types at Present Operating in Great Britian. G. J. Shaw. *Iron & Steel,* v. 28, Sept. 1955, p. 415-420.
Advantages obtained by operating hot blast cupolas. Various types of hot blast systems in use in United Kingdom. Details of their operating techniques and performance. Diagrams. 8 ref. (E10)

390-E. The Shaw Process of Precision Casting. *Machinery (London),* v. 87, Sept. 2, 1955, p. 577-584.
Developments and applications of process which rivals "lost wax" and die cast procedures. Photographs. (E15)

391-E. Handling Methods in Non-Ferrous Foundries—First Principles. Frank Hudson. *Metal Industry,* v. 87, Sept. 2, 1955, p. 185-190.
Suggests ways of increasing efficiency by avoiding direct handling in various foundry duties. Capital equipment changes suggested. Photographs, diagrams, table. 11 ref. (E11, A5)

392-E. Casting of Steel Shot. F. T. Efimov, F. I. Mikhalev, and P. G. Karpov. *Henry Brutcher Translation No.* 3452, 9 p. (Abridged from *Liteinoe Proizvodstvo,* v. 5, no. 6, 1954, p.1-3.) Henry Brutcher, Altadena, Calif.
Previously abstracted from original. See item 662-E, 1954. (E general, CI)

393-E. Carbon Dioxide Hardening Process for Coremaking With a Coreblowing Machine. W. Jansen. *Henry Brutcher Translation No.* 3456, 4 p. (From *Giesserei,* v. 42, no. 9, 1955, p. 236-237.) Henry Brutcher, Altadena, Calif.
Previously abstracted from original. See item 255-E, 1955. (E21)

394-E. (German.) **The Progress in the Production and Application of High Alloy Cast Steel in the Chemical Industry.** F. Pölzguter. *Werkstoffe und Korrosion,* v. 6, nos. 8-9, Aug.-Sept. 1955, p. 375-385.

Analyses of various alloy steels and high alloyed materials of the Stellite and Hastelloy groups and titanium. Description of the techniques of various casting processes, including normal, centrifugal, Croning and precision casting methods. Tables, graphs, photographs, diagrams. (E general, T29, AY, Co, Ni, SG-g, h)

395-E. (Polish.) **Casting of Metals.** Stanislaw Ruranski. *Wiadomosci hutnicze,* v. 11, nos. 7-8, July-Aug. 1955, p. 241-248.

Sand, continuous, vacuum, precision, die and other types of casting. Photographs. (E general)

396-E. (Russian.) **Manner of Operation in Mechanical Inertia Shakeout Screens and Vibration Screens.** P. N. Aksenov. *Liteinoe proizvodstvo,* 1955, no. 8, Aug., p. 16-19.

Equations covering damping, proportional speeds, forced vibrations and other factors in the operation. Graphs, table. 7 ref. (E24)

397-E. (Russian.) **Mechanism of the Formation of Gas Pores in Castings.** L. S. Sapiro. *Liteinoe proizvodstvo,* 1955, no. 8, Aug., p. 21-22.

Types of gaseous inclusions; conditions for their appearance; measures for avoiding them. Micrographs, diagram. 4 ref. (E25, CI, Ni, Cu)

398-E. **Gas in Light Alloys.** N. J. McGaw. *Australasian Engineer,* 1955, July, p. 46-49, 88.

Occurrence, effect and removal of gas, the presence of which is due essentially to moisture that has numerous sources in connection with melting and casting. Possibilities of removing gas from the liquid metal. Graphs, radiographs, micrographs. 7 ref. (E25, EG-a)

399-E. **Shell Molding at Lynchburg.** Robert H. Herrmann. *Foundry,* v. 83, Oct. 1955, p. 102-115.

One of first foundries designed, built and operated solely to produce shell mold castings. Makes gray and ductile iron parts. Photographs, diagram. (E16, A5, CI)

400-E. **Castability of Aluminum Alloys.** M. M. Karnowsky. *Foundry,* v. 83, Oct. 1955, p. 116-118.

Results of studies to determine castability of the alloys and factors which affect this property. Spiral test castings used to measure running qualities. Graphs, photographs, tables. (E25, Al)

401-E. **Melting Furnaces in the Brass Foundry.** Harry St. John. *Foundry,* v. 83, Oct. 1955, p. 119-125.

Suggests considering quality of metal, working conditions, operation, investment and maintenance cost, flexibility and convenience, maintenance and operating skill. Photographs, diagrams. (E10, Cu)

402-E. **Use of Zircon Sand in Producing Large Castings.** Hubert Chappie. *Foundry,* v. 83, Oct. 1955, p. 126-131.

Reduces metal penetration of sand. Graph, table, photographs. (E18, ST, Zr)

403-E. **Close Control Pays Off in Aluminum Foundry Operations.** Edwin Bremer. *Foundry,* v. 83, Oct. 1955, p. 135-139.

Careful control of all operations during production of the alloy castings has paid big dividends to small foundry. Photographs, flowsheet. (E general, Al)

404-E. **Spalling of Green-Sand Moulds and Its Relation to Casting Defects.** H. Pettersson. *Foundry Trade Journal,* v. 99, Sept. 8, 1955, p. 263-271; v. 99, Sept. 15, p. 301-308; disc., p. 308-309.

Study of resistance to sudden heat of molten metal, composition of sand and mold hardness. Considers influence of gas pressure and thermal expansion of sand, rate of heating; grain size and distribution of sand; quality and quantity of binder; moisture content; additions of coal dust, cereals, and sugar; storage of molds; ramming density or mold hardness; and relation between spalling resistance and test values obtained by normal sand testing. Graph, diagrams, table. 10 ref. (E18, E19)

405-E. **Effect of Mould Material on the Solidification Rate of Cast Metals.** *Foundry Trade Journal,* v. 99, Sept. 15, 1955, p. 291-298; v.99, Sept. 22, 1955, p. 331-339.

The coarser the sand, the harder a mold is rammed, the higher the moisture content of a sand, the greater the cooling power. Coal dust causes some increase in cooling power of mold in casting sections up to 1½-in. thick. Diagrams, micrographs, photograph, tables, graphs. 8 ref. (E25, E18, CI)

406-E. **What the Future Holds for the Foundry Industry.** George W. Cannon. *Metal Progress,* v. 68, Sept. 1955, p. 133-136.

Past progress and future trends. Progress in the foundry industry will be most stimulated by sound, scientific management and by the

establishment of good apprentice training programs. Photograph. (E general)

407-E. **Pros and Cons of Shell Molding Process.** (Digest of "What Does Shell Molding Offer the Producer and User of Castings?" by W. H. Dunn; presented at Western Metal Congress, Mar. 28, 1955.) *Metal Progress,* v. 68, Sept. 1955, p.214, 216, 218.

Review of methods and equipment. (E16)

408-E. **How We Solved Our Hot Cracks Problems.** F. W. Jacobs. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 30-36.

Defects apparently were caused by pouring too refined a metal into sand which was too insulating. Melting operations and metal composition described. Tables, photographs, graph. (E25, CI)

409-E. **Practical Tips on Shell Molding.** G. P. Derby. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 42-47.

Problems of making and assembling shell molds. Photographs. (E16)

410-E. **59 Answers to Your Shell Molding Problems.** Jack E. Bolt. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 48-51.

Review of shell defects and preventive measures. Diagram, photographs. 4 ref. (E16)

411-E. **What's the Feeding Range in Shell Molds?** W. S. Pellini, H. F. Bishop and R. E. Morey. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 52-56.

Feeding characteristics of risers. Photographs, graphs, table radiographs. 14 ref. (E16, E22)

412-E. **Chain Casting Secrets.** Bill Walkins. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 58-59.

Methods and equipment for casting interlocking steel chain links. Photographs. (E general, CI)

413-E. **One Iron in the Cupola—Many in the Ladle.** Grant E. Spangler and R. Schneidewind. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 60-64.

Carbon can be introduced in molten cast irons in a ladle or a forehearth by the injection process. Increases of up to 1% carbon were made consistently in 3 min. or less. Tables, graphs, micrographs. 7 ref. (E23, E25)

414-E. **No Need for Rat-Tails.** Harry W. Dietert. *Modern Castings and American Foundryman,* v. 28, Oct. 1955, p. 65-68.

Sand selection, proper mixtures and controlled ramming help eliminate this casting defect. Photographs, micrographs, graph. (E11, CI)

415-E. **What Alloy for Investment Casting?** William W. Lamb. *Steel,* v. 137, Oct. 3, 1955, p. 72-73.

Representative alloys and their properties given in table form to provide immediate selection of the proper metal. Photographs, table. (E15, Cu, Be)

416-E. **Hydrodynamic Theory of Horizontal Centrifugal Casting.** B. F. Vilyum. *Henry Brutcher Translation No.* 3566, 11 p. (From *Izvestiya Akademii Nauk SSSR, OTN,* 1954, no. 10, Oct., p. 39-46.) Henry Brutcher, Altadena, Calif.

Study of motion of a heavy viscous liquid rotating around a horizontal axis of symmetry. Development of equations for the distribution of a liquid around the internal periphery of a hollow tube rotating about its center of symmetry where the thickness of the liquid layer is a small fraction of the tube's internal rádius. Table, diagrams, 2 ref. (E14)

417-E. (Czech.) **Pouring of Heavy Traverses for Machine Tools.** Svatopluk Jouza. *Slévarenstvi,* v. 3, no. 8, Aug. 1955, p. 233-236.

Use of a combined gating system, partly from side bottom runner and partly by using the shower system, was required for flowing and directional solidification to produce sound castings. Diagrams. (E22, E25)

418-E. (Czech.) **Exothermic Sleeves for Risers.** Lev Petrzela. *Slévarenstvi,* v. 3, no. 8; *Prace Ceskoslovenského vyzkumu slévarenského,* v. 2, no. 21, Aug. 1955, p. 145-148.

Because of their control, best results are obtained with mixtures with aluminothermic reactions. Photographs, graphs, table. 23 ref. (E22, CI, ST)

419-E. (Czech.) **Use of Oxygen in the Cupola.** Zdenek Hostinsky and Cestmir Hlousek. *Slévarenstvi,* v. 3, no. 8, *Prace Ceskoslovenského vyzkumu slévarenského,* v. 2, no. 22, Aug. 1955, p. 149-156.

Oxygen enrichment studied in the laboratory and foundry. A 1% oxygen increase raised cupola temperature 13° C. and output 6.7%. Cost

of oxygen limits its application. Tables, diagram, photograph, graphs. (E10, CI)

420-E. (French.) **Feed Heading of Steel Moldings. Development; Study; Preparation; Examples of Applications.** Maurice Josset. *Fonderie,* 1955, no. 115, Aug., p. 4641-4650.

Gravity and atmospheric feed heads, centrifugal pressure casting, applications to high-pressure pump parts and a helical shaft support. Diagrams. (E22, ST)

421-E. (French.) **Comparison of the Costs of Industrial Operation of Water-Cooled Cupolas and Cupolas With Normal Acid Lining.** Francois Danis and Pierre Détrez. *Fonderie,* 1955, no. 115, Aug., p. 4651-4658.

Comparative study of operating costs in 1953 and 1954 of above cupolas of approximately the same size and production. Tables, diagrams. (E10, CI)

422-E. (German.) **Introduction of Core-Molding Method in the Reorganization of a Large Casting Foundry.** Fulvio Forti. *Giesserei,* v. 42, no. 18, Sept. 1, 1955, p. 457-462.

Nature of the method, operating instructions when applied to the large castings, advantages and disadvantages of the process. Graphs, photographs, diagrams, tables. 1 ref. (E21)

423-E. (German.) **Advances Made in the Production and Application of Centrifugal Castings of Steel.** Franz Pölzguter. *Giesserei,* v. 42, no. 19, Sept. 15, 1955, p. 493-500.

Principles of various processes, history and present status of patent rights, production of tubes in horizontal and vertical machines; applications. Photographs, diagrams, tables, graphs. 11 ref. (E14, CI)

424-E. (German.) **The History of the Norwegian Foundry Industry.** Torolf Krogvig. *Giesserei,* v. 42, no. 19, Sept. 15, 1955, p. 524-526.

Describes charcoal blast furnaces, cast iron ware, introduction of cupolas and the Hiorth and Tysland furnaces. Photographs, diagrams. 4 ref. (E10, D1, CI)

425-E. Effect of Mould Material on the Solidification Rate of Cast Metals. *Foundry Trade Journal,* v. 99, Sept. 29, 1955, p. 349-354; disc., p. 354-358.

Slush casting experiments with various molding sands and sand additives. Diagrams, tables, graphs, photograph. (E16, E19, E25, CI)

426-E. Pressure Die Casting at the Works of the Wolverhampton Die-Casting Co., Ltd. *Machinery (London),* v. 87, Sept. 30, 1955, p. 789-796.

Considers zinc-base alloy castings and dies in which they are produced. Photographs. (E13, Zn)

427-E. (German.) **Modern Combined Melting and Holding Furnaces in Light Metals Foundries for Sand, Gravity-Die, and Pressure-Die-Casting.** F. Ostler. *Aluminium,* v, 31, no. 10, Oct. 1955 p. 477-483.

Reasons for development of multichamber induction furnaces. Study of four examples. Photographs, diagrams, graphs. (E10, E11, E13, EG-a)

428-E. Aluminum Alloy Pattern Match-Plate. Edward Magder. *Canadian Metals,* v. 18, Oct. 1955, p. 39-40, 42.

Key to cost reduction in the foundry. Photographs, table. (E17, Al)

429-E. Intricate Plaster Mold Castings. Kenneth L. Mountain. *Foundry,* v. 83, Nov. 1955, p. 100-106.

Produces accurate, pressure-tight, high-strength and surface-smooth castings that do not require machining. Photographs. (E16)

430-E. The Brass Foundry. Harry St. John. *Foundry,* v. 83, Nov. 1955, p. 107-111.

Flame appearance check, charcoal cover, carbonaceous material, charging furnace, furnace atmosphere, refractory maintenance, water vapor and correct moment for pouring. Photographs. (E10, Cu)

431-E. Gun-Metal Bronze Castings. W. H. Johnson, H. F. Bishop and W. S. Pellini. *Foundry,* v. 83, Nov. 1955, p. 120-127.

Comparing methods of improving soundness, vacuum treatment of melts reduces gas content of metal to prevent precipitation of gas during solidification, and, by accentuating directional feeding, wedge chilling permits more nearly complete feeding. Photographs, diagrams, micrographs, graphs. 4 ref. (E25, Cu)

432-E. What Happens When a Core Is Baked? Carl E. Schubert. *Foundry,* v. 83, Nov. 1955, p. 128-130.

Laboratory experiments to determine temperature reactions and role of oxygen during core baking cycle. Graphs, diagrams. (E21)

433-E. The Use and Function of Chills and Sand Molds. W. M. Halliday. *Foundry,* v. 83, Nov. 1955, p. 162, 165-166, 168.

Principles and purposes of chills, materials, dressings, venting and shape. (E11, E19)

434-E. Displacement Casting. H. K. Barton. *Mechanical World and*

Engineering Record, v. 135, Oct. 1955, p. 460-462.
Two modifications of the basic Cothias process have recently come into use, as an alternative to die casting, for small quantities of speculative items. Diagrams. (E13, E16)

435-E. Die Castings Did It. *Modern Metals,* v. 11, Oct. 1955, p. 44, 48.
Magnesium and aluminum dies are used to make wide-screen motion picture projection lens. Photographs, table. (E13, Mg, Al)

436-E. (French.) **The Solidification of Light Alloys—Study of Shrinkage.** André Tatur. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 89-100.
Carried out on specimens with conical top of type recommended by Portevin and Bastien. Diagrams, photographs, table, graphs. 7 ref. (E25, EG-a)

437-E. (German.) **Development of Measurement and Control Techniques for Hot Air Cupola Furnaces.** Fritz von Mertz. *Giesserei,* v. 42, no. 20, Sept. 29, 1955, p. 549-551.
Wind, temperature, cooling and combustion air, pressure, carbon monoxide and carbon dioxide measurement methods and construction of control panels. Photograph, graphs, diagrams.
(E10, S16, S18, ST)

438-E. (Spanish.) **Experiments on the Use of Oxygen and Hot Blast in the Classical Cupola.** Jaime Galve. *Instituto del hierro y der acero,* v. 8, no. 36, Apr.-June 1955, p. 159-170.
Results of experiences in Spanish cupolas for improving the coke characteristics. Graphs, diagrams, photograph. 22 ref. (E10)

439-E. Chemical Reactions in the Cupola. G. A. H. Jungbluth and K. Stockkamp. *Foundry Trade Journal,* v. 99, Oct. 6, 1955, p. 377-387.
By increasing the temperature in the reaction zone and reducing the iron and manganese oxides and silica, a transfer of phosphorus from the charge to the iron as well as reduction of sulfur content in the iron will take place when cupola is operated with acid slag. Tables, graphs, 23 ref. (To be continued.) (E10, CI)

440-E. Recommended Melting Practice for Small Heats. I. Nicholas J. Grant. *Precision Metal Molding,* v. 13, Nov. 1955, p. 32-33, 71-73.
General and specific problems encountered in investment casting. Tables. (E15)

441-E. (Czech.) **Effect of Feeding Rate of Metal in Casting Upon Its Inner Quality.** Stanislav Simonik. *Slévarenstvi,* v. 3, no. 9, Sept. 1955, p. 258-260.
Analysis of solidification and feeding mechanism shows that shrinkage is directly related to solidification velocity and can be controlled by correct design. Diagrams. 5 ref. (E25)

442-E. (Czech.) **Production of Pump Wheel Castings.** Vitezslav Batek and Jan Cechura. *Slévarenstvi,* v. 3, no. 9, Sept. 1955, p. 273-274.
Design measures to reduce expansion scabs, sand inclusions, gas holes, cold shuts, and hot tears for defect-free castings. Diagram, photographs. (E general)

443-E. (German.) **Fundamentals of Vibration Treatment in Metallurgy.** H. J. Seemann and H. Staats. *Metall,* v. 9, nos. 19-20, Oct. 1955, p. 868-877.
Use of intensive mechanical vibrations in the treatment of metal parts and melts. Diagrams, graphs. 17 ref. (E24)

444-E. (Italian.) **Granular Mineral Black.** *Fonderia,* v. 4, no. 9, Sept. 1955, p. 409-414.
Observations and experiences using mineral black in Italy in molding sands. Graphs, micrographs, table. (E18)

445-E. (Russian.) **Pressure Casting of Copper Alloys.** V. M. Pliatskii. *Liteinoe proizvodstvo,* 1955, no. 9, Sept., p. 4-7.
Critical factors involved, relating to the casting procedure and mold specifications. Diagrams, tables, photographs. (E13, Cu)

446-E. (Russian.) **Importance of the Fuel Quality for Equipment in the Casting Industry.** L. M. Marienbakh. *Liteinoe proizvodstvo,* 1955, no. 9, Sept., p. 7-9.
Calculation of cast iron temperatures in relation to fuel economy; suggestions for increasing the efficiency of cupola furnaces; processes in the reduction zone. Nomogram. 6 ref. (E10, CI)

447-E. (Russian.) **Experiment in the Operation and Use of Water Cooled Cupola Furnaces.** N. A. Barinov. *Liteinoe proizvodstvo,* 1955, no. 9, Sept., p. 9-12.
Design of cupolas; comparison of yield, temperature factors, fuel consumed and repair requirements for water-cooled and nonwater-cooled cupolas; chemical composition of slags; cupola for melting spheroidal cast iron. Tables, diagrams, micrographs. (E10, E25, CI)

448-E. (Russian.) **Behavior of Hydrogen in Metals, Under the Influence of Direct Current.** D. P. Lovtsov. *Liteinoe proizvodstvo,* 1955, no. 9, Sept., p. 15-19.

Various forms in which hydrogen occurs in metals; problems of gas inclusions in metals and causes of porosity; effect on mechanical properties of castings. Diagrams, photographs, table. 5 ref. (E25, Al, Mg)

449-E. (Russian.) **Quality of Castings in Relation to Thermal Resistance of Molds and Cores.** N. P. Nikolaichik. *Liteinoe proizvodstvo,* 1955, no. 9, Sept., p. 20-22.

Evaluation of fire-clay, sand and special mixtures for molds and cores; effect of bottom pouring. Micrographs, tables. 3 ref. (E11, E18, CI)

450-E. (Swedish.) **The Sulfur Index (S)/[S] as a Function of the Components of the Slag in the Metallurgical Blast Cupola.** Jörgen Drachmann. *Gjuteriet,* v. 45, no. 7, July 1955, p. 89-95.

The basicity index CaO-SiO_2 gives a good measure of the effect of the slag composition on the sulfur index. Diagrams, tables, graphs. 5 ref. (E10)

451-E. (Book.) **Principles of Metal Casting.** Richard W. Heine and Philip C. Rosenthal. 639 p. 1955. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y. $7.50.

Textbook designed for college courses in metallurgical and mechanical engineering. For the former, emphasis is placed on the aspects of foundry processes and materials; the latter group is given a survey of the principles of processes and the proper utilization of castings for engineering purposes. (E general)

SECTION F

PRIMARY MECHANICAL WORKING

1-F. Drop Forging in the Railway Industry. I. The Forging Practice of British Railways (Midland Region). *Metal Treatment and Drop Forging,* v. 21, Oct. 1954, p. 469-476.

Equipment and practices for producing wide range of types and sizes of forgings from new material and from scrap. Photographs, diagrams, table. (To be continued.) (F22, ST)

2-F. (French.) **Contribution to the Study of the Heating Cycle of Special Steels in Rolling-Mill Pusher-Type Furnaces.** M. Boutin. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 10, 1954, p. 1931-1944.

Selection of furnace, heating curves, quality and regulation of heat, furnace atmospheres, heat consumption, etc. Tables, graphs. 9 ref. (F21, ST)

3-F. Steel and Copper Rod Rolling: A Comparison of Techniques. J. Guthrie and E. Fischl. *Australasian Engineer,* 1954, Sept., p. 52-60; disc., p. 60-63.

Contrasts two types of rolling mills. Construction features, economic factors, pass designs. Diagrams, photographs, table. 3 ref. (F23, Cu, ST)

4-F. Steel Sections for Welding. R. G. Braithwaite. *British Welding Journal,* v. 1, Nov. 1954, p. 481-486.

Production of various shapes and welding techniques for their use. Diagrams. 2 ref. (F general, K general, ST)

5-F. Resistance Heating, Pressure Combined to Rapidly Form Aluminum Extrusion. W. D. Latiano. *Iron Age,* v. 174, Nov. 4, 1954, p. 124-125.

Converted resistance welder provides rapid heating, close control, low heat losses and prevention of overaging. Photographs. (F24, K3, Al)

6-F. A Mechanical Extrusion Press for Producing Tubes and Bars. Astor L. Thurman. *Iron and Steel Engineer,* v. 31, Nov. 1954, p. 64-73; disc., p. 73-74.

Equipment, processes and materials processed. Tables, diagrams, photographs, graphs. (F24, ST)

7-F. Mechanical Features of Modern Bar and Rod Mills. E. C. Peterson. *Iron and Steel Engineer,* v. 31, Nov. 1954, p. 103-108; disc., p. 108-111.

Refinements in engineering and auxiliaries produce better bar and rod at increasing speeds. Photographs, diagrams. (F27)

8-F. An Investigation of Reheating Furnace Design and Performance. F. A. Gray and S. H. Brooks. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 223-266.

Interrelationships of variables affecting billet heating furnaces. Diagrams, photograph, graphs, tables. 8 ref. (F21, ST)

9-F. The Operation of Soaking Pits. J. Dodd. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 297-300 + 1 plate.

Fuel savings by proper control and organization. Photographs. (F21, ST)

10-F. Versatile Pint-Sized Rolling Mills. A. I. Nussbaum. *Modern Metals,* v. 10, Nov. 1954, p. 74, 76, 78.

Research mill can be rapidly converted from two-high to four-high configuration. Photographs, tables. (F23)

11-F. The Rolling of Metals and Alloys. III. E. C. Larke. *Sheet Metal Industries,* v. 31, no. 331, Nov. 1954, p. 947-951, 958.

Causes and control of thickness

variations. Photograph, graphs. 5 ref. (To be continued.) (F23)

12-F. **Billet Separation by the Shear-Fracture Method.** W. C. Tucker. *Steel Processing,* v. 40, Nov. 1954, p. 695-698, 731.

Theory and techniques for cutting steel billets to desired lengths. Photographs, diagrams. (F29, ST)

13-F. **Lubricants for Press and Forge Equipment.** A. A. Paul. *Steel Processing,* v. 40, Nov. 1954, p. 703-704, 738-739.

Types of lubricants for various applications. (F1)

14-F. **Automatic Furnace Line Highly Versatile in Forge Shop Heat Treating.** W. F. Herdrich. *Steel Processing,* v. 40, Nov. 1954, p. 723-726, 728.

Design, arrangement and experience with mechanized heat treating installation. Photographs, diagram, tables, micrographs. (F21, ST)

15-F. **Plate Edge Preparation.** *Welding and Metal Fabrication,* v. 22, Nov. 1954, p. 402-407.

Comments from various fabricators on relative merits of gas cutting and mechanical shearing. Photographs. (F29, ST)

16-F. **Quality Control in the Wire Industry.** Axel U. Sternlof. *Wire and Wire Products,* v. 29, Nov. 1954, p. 1315-1317.

Installations and procedures for short runs with frequent set-ups. Photographs, graphs. (F28)

17-F. (French.) **Cold Shapes—Preparation and Interest.** A. Ogus. *Métallurgie et la construction mécanique,* v. 86, no. 9, Sept. 1954, p. 643, 645-647, 649.

Production by wire drawing dies and bending presses; comparison between cold shapes and hot rolled products. Diagrams, photographs. (F28, G6, ST)

18-F. (German.) **Induction Heating of Forging Billets.** *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 29, Oct. 11, 1954, p. 990-991.

Power consumption and heating times as functions of diameter of billet and frequency; faster heating in a longitudinal than in a transverse field. Graphs. (F21, J2, ST)

19-F. (German.) **Production of Sheet Metal.** Erich Howahr. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 30, Oct. 21, 1954, p. 997-1004.

History and description of modern sheet metal rolling mills. Photographs, diagrams. (F23)

20-F. (Italian.) **Fundamentals of Extrusion Theory.** F. Gatto. *Alluminio,* v. 23, no. 5, Oct. 1954, p. 533-545.

Calculations of pressure considering geometry of container, type of alloy, temperature and extrusion rate. Results compared with experimental data. Photographs, diagrams, graphs, tables. 6 ref. (F24)

21-F. (Russian.) **Change of Shape of Prismatic Metallic Specimens During Hammer Upsetting.** A. I. Skonechnyi. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 57-62.

On the basis of experimental data and mathematical analysis, formulas are derived for calculating maximum and minimum deformation during forging. Tables, diagrams. 4 ref. (F22)

22-F. (Polish.) **Lowering the Costs of Wear in Rolls.** Jozef Gorecki. *Hutnik,* v. 21, no. 9, 1954, p. 285-291.

Advantageous design and arrangement of various types of roll passes. Comparative wear figures. Diagrams, table. (F23, Q9)

23-F. **Induction Heating for Hot Forging—Induction Heat.** Frank T. Chesnut. *Metal Progress,* v. 66, Dec. 1954, p. 91-94.

Advantages and applications of various types of induction heaters. Graphs, table. (F21, F22, J2)

24-F. **60-Cycle Induction Heating for Forging and Extrusion.** John A. Logan. *Metal Progress,* v. 66, Dec. 1954, p. 94-98.

Low first cost of 60-cycle equipment makes induction heat competitive in bulk heating applications for forging and extrusion, where cost of high-frequency equipment has ruled it out of consideration. Photographs.
(F21, F22, F24, J2, ST, Al, Mg, Cu)

25-F. **The Case for High Frequency.** Frank T. Chesnut. *Metal Progress,* v. 66, Dec. 1954, p. 98-101.

Numerous examples from practice show that high-frequency equipment (1000 cycles and up) can heat steel billets efficiently and rapidly and that its adaptability is worth more than the extra cost of frequency changers. Table, photographs. (F21, J2, ST)

26-F. **Dual-Frequency Heating for Hot Forging.** Carl P. Bernhardt. *Metal Progress,* v. 66, Dec. 1954, p. 102-105.

Mass production of fairly heavy steel items favors low frequency for heating to the Curie point, and high frequency for further heating to forging temperature. Photographs. (F21, F22, J2, ST)

27-F. Titanium Forgings. E. A. Fentzlaff. *Product Engineering,* v. 25, Dec. 1954, p. 129-132.

Development of special alloy and production forging techniques for shaping titanium parts for industrial uses. Tables, photograph, diagram. (F22, Ti)

28-F. (Czech.) **Calculation of Rolling Pressure.** Antonin Vach. *Hutnické Listy,* v. 9, no. 7, July 1954, p. 399-403.

Considers effects of yield strength, stress distributions, friction, work hardening and other factors. Graphs. 7 ref. (F23)

29-F. (French.) **Operation of Soaking Pits. Their Regulation.** M. Woll. *Flamme et Thermique,* v. 8, no. 73, Oct. 1954, p. 11-20, 29-34.

Installation and operation; remedies for present difficulties; thermal balance sheets. Diagram, charts, photographs, tables. (F21)

30-F. (Polish.) **Corrections for Calculation of Elongation and Spread During Hot Rolling of Alloy Steels.** Z. Wusatowski and E. Szostak. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 217-220.

Experimental data for 13 steels used to refine Wusatowski's formulas. Graphs, table. 4 ref. (F23, AY)

31-F. Increasing Rod Production by Conversion of a 2-Strand Rod Mill to 3-Strand Operation. C. H. Burden and W. E. Zelley. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 55-65; disc., p. 65-67.

Ingenious conversion program gave increased production economically with a minimum of disturbance to operations. Diagrams. (F27, CN)

32-F. Maintenance of Slag Bottom Soaking Pits. John A. Warchol, Jr. *Iron and Steel Engineer,* v. 31, Dec. 1954, p. 121-122; disc., p. 122-124.

Heating units, control of slag accumulation and slag removal. (F21, ST)

33-F. The Rolling of Metals and Alloys. III. E. C. Larke. *Sheet Metal Industries,* v. 31, no. 332, Dec. 1954, p. 1033-1038.

Magnitude, causes and control of thickness variations. Graphs, table. 5 ref. (To be continued.) (F23)

34-F. The Production of Welded Stainless Steel Pipe. A. Grodner. *Welding Journal,* v. 33, Dec. 1954, p. 1171-1174.

Production welding procedures, radiographic inspection and heat treatments. Diagrams, photographs. (F26, S13, J general, SS)

35-F. Cutting Sheet Aluminum. E. V. Sharpnack, Sr. *Heating, Air Conditioning, Sheet Metal Contractor,* v. 46, Dec. 1954, p. 34-37.

Data and equation for computing shearing energy required for alloys in various tempers. Table, photographs. (F29, Al)

36-F. The Fabrication of Chromium and Some Dilute Chromium-Base Alloys. F. Henderson, S. T. Quaass and H. L. Wain. *Institute of Metals, Journal,* v. 83, Dec. 1954, p. 126-132 + 1 plate.

High-purity chromium can be forged, swaged and rolled. Alloys with up to 1% titanium and up to 5% tungsten can be fabricated by the same methods. Tables, diagram, photographs, micrographs. 21 ref. (F22, F25, F23, Cr)

37-F. Steel for Radially Stressed Heavy Forgings. Otto Krifka. *Steel Processing,* v. 40, Dec. 1954, p. 757-766. (Reprinted from *Stahl und Eisen,* v. 74, no. 12, June 3, 1954, p. 760-768.)

Previously abstracted from original. See item 265-F, 1954. (F22, D9, S13, ST)

38-F. Continuous Wire Drawing and Packaging. William H. Richardson. *Wire and Wire Products,* v. 29, Dec. 1954, p. 1430-1433, 1482-1486.

Manufacturer and consumer both gained by adoption of unique packaging process. Photographs. (F28, A5, Cu)

39-F. (German.) **Heated Ingot Receptacles for Extrusion of Light and Nonferrous Metals.** H. M. Hiller. *Metall,* v. 8, nos. 23-24, Dec. 1954, p. 923-929.

Causes of defects; relationship between rate of extrusion and operation temperature. Graphs, tables, 6 ref. (F24, EG-a)

40-F. Inert-Gas Forging. Carl L. Kolbe. *Electrochemical Society, Journal,* v. 101, Dec. 1954, p. 601-603.

Equipment in which materials can be worked at very high temperatures without gross oxidation. For some alloys, less diffusion of gases, minor slippery oxide films, less surface cracking and easier deformation at higher temperatures. Diagrams, table. (F22, Mo, Ti W)

41-F. Some Factors Affecting the Quality of Extrusions. III. Christopher Smith and Norman Swindells. *Industrial Heating,* v. 21, Dec. 1954, p. 2446 + 6 pages.

Influence of temperature on extrusion of copper and aluminum alloys. Table. (To be continued.) (F24, Cu, Al)

42-F. New Extrusion Techniques. E. J. de Ridder. *Tool Engineer,* v. 34, Jan. 1955, p. 69-74.

Extrusions as forging stock; new dies for hollow extrusions; combined extrusion-forging operation; tapered designs; new straightening methods; thin wall extrusions. Diagrams, photographs.
(F24, F22, Al, Mg)

43-F. Soaps for Wire-Drawing. H. F. Frost. *Wire Industry,* v. 21, Dec. 1954, p. 1199-1201, 1225.

Review of current practice and theory. Photographs. (F28, F1)

44-F. The Influence of Lubricants on the Drawing Force in Cold-Drawing Wire Rod. Werner Lueg and Karl-Heinz Treptow. *Wire Industry,* v. 21, Dec. 1954, p. 1211 + 4 pages. (Condensed from *Stahl und Eisen,* v. 74, no. 21, Oct. 7, 1954, p. 1334-1342.)

Previously abstracted from original. See item 392-F, 1954.
(F1, F27, ST)

45-F. How to Select Size of a Rolling Mill Drive Motor. A. J. Winchester. *Blast Furnace and Steel Plant,* v. 43, Jan. 1955, p. 60-64.

Factors to be considered; examples of typical installations. Photographs, graphs, tables. (F23)

46-F. (Polish.) **New Methods of Investigating the Relative Movement of Metal Surfaces in Contact With Rolls.** Jerzy Bazan. *Hutnik,* v. 21, no. 10, Oct. 1954, p. 316-320.

Apparatus and techniques. Diagrams, table. 8 ref. (F23)

47-F. Substitutes for Palm Oil in the Cold Rolling of Steel. W. R. Johnson, Harry Schwartzbart and J. P. Sheehan. *American Iron and Steel Institute, Preprint,* 1954, 27 p.

Laboratory and mill tests to evaluate lubricants show that palm oil and modified tallow offer best lubricity. Tables, graphs. 4 ref.
(E23, F1, ST)

48-F. Sixty-Cycle Induction Heating of Large Steel Sections for Hot Forming. III. C. H. Hartwig. *Industrial Heating,* v. 22, Jan. 1955, p. 46, 48, 190-194.

Temperature, current and power curves for heating larger ingots of carbon, silicon, nonmagnetic stainless and high speed toolsteels. Graphs, tables. (To be continued.)
(F21, J2, ST)

49-F. Some Factors Affecting the Quality of Extrusions. IV. Christopher Smith and Norman Swindells. *Industrial Heating,* v. 22, Jan. 1955, p. 100, 102, 104, 106.

Heat treatment of aluminum extrusions and final processing of copper extrusions. 7 ref.
(F24, J general, Cu, Al)

50-F. Modernization of Rod Mill at Steel Company of Canada. D. W. McLean. *Iron and Steel Engineer,* v. 32, Jan. 1955, p. 59-63; disc., p. 63-65.

Solutions of the technical and operating problems. Diagrams, photographs. (F27, ST)

51-F. Electrical Features of Universal Slabbing and Hot Strip Finishing Mills at Fairless. Warren Reid and R. H. Wright. *Iron and Steel Engineer,* v. 32, Jan. 1955, p. 97-104; disc., p. 104-105.

Unusually high power features main drives. Photographs, circuit diagrams, graphs. (F23)

52-F. Guides and Strippers for Modern Rod and Bar Mills. F. Starkey. *Iron and Steel Institute, Journal,* v. 179, Jan. 1955, p. 58-75.

Various designs and factors controlling selection. Diagrams, photographs. 3 ref. (F27, F23, ST)

53-F. Problems of Forging. G. W. Richards. *Metal Industry,* v. 86, Jan. 28, 1955, p. 63-66.

Causes of high internal stresses in high-strength aluminum alloy forgings. Photographs, graphs.
(F22, Q25, Al)

54-F. A Comparison of Lubricant Carriers for Stainless Steel Wire. H. Kuntze and A. Pomp. *Wire Industry,* v. 22, Jan. 1955, p. 58, 61-62, 65. (Digest from *Stahl und Eisen,* v. 74, no. 21, Oct. 7, 1954, p. 1325-1334.)

Previously abstracted from the original. See item 391-F, 1954.
(F1, F28, C-n, SS)

55-F. Distribution of Pressure Over the Contact Area in Rolling. I. G. Astakhov. *Henry Brutcher Translation no.* 2906, 6 p. Henry Brutcher, Altadena, Calif. (Condensed from *Trudy Moskovskogo Instituta Stali im, I. V. Stalina,* Symposium no. 30 on "Structure and Properties of Steel", 1951, p. 147-180.)

Contact pressure variations on metal strips of different widths; influence of amount of cold reduction on distribution in direction of rolling; effect of rolling speed and lubricant on character and magnitude of pressure between strip and rolls. Graphs, table. 3 ref.
(F23, F1, Cu, ST)

56-F. (French.) **Study on the Ingot and Its Yield.** Dargent. *Centre de Documentation Sidérurgique, Circulaire d' Informations Techniques,* v. 11, no. 12, 1954, p. 2315-2322.

Methods for decreasing ingot consumption in rolling of plates. Tables. (F23, D9, CN)

57-F. (German.) **Layout and Operation of the New Strip Mill Train at Mülheim (Ruhr).** Joachim Achtelik. *Stahl und Eisen,* v. 74, no. 27, Dec. 30, 1954, p. 1767-1773.
Range of products; evaluation of experience to date. Diagrams, photographs, tables, graph. (F23, ST)

58-F. (German.) **Computing the Average Length in Rolling Steel Shapes With Flanges and Webs.** Alfred Bahr. *Stahl und Eisen,* v. 75, no. 2, Jan. 27, 1955, p. 95-96.
Simple formula for computing average elongation during rolling of any steel shape. Diagrams, table. 10 ref. (F23, ST)

59-F. (German.) **Scaling and Surface Decarburization as an Undesirable Result of Heating for Forging.** Dietrich Horstmann. *Stahl und Eisen,* v. 75, no. 2, Jan. 27, 1955, p. 97.
Effects of temperature, oxygen concentration, time and type of steel. Graphs, nomogram. 3 ref. (F21, F22, ST)

60-F. (Russian.) **Calculation of Pressure of Metal on Rolls During Cold Rolling, Taking Into Consideration Strain and Cold Hardening.** A. I. Tselikov and A. V. Tret'iakov. *Vestnik Mashinostroeniia,* v.34, no. 12, Dec. 1954, p. 10-12.
Mathematical treatment. Graphs, diagrams, table. 4 ref. (F23, CN)

61-F. (Russian.) **Problem of the Impact of Metal on the Rolling Mill Table Rollers.** F. F. Gorodkov. *Vestnik Mashinostroeniia,* v. 34, no. 12, Dec. 1954, p. 12-16.
Two particular cases studied in detail on basis of plastic mechanics. Diagrams, graph. 7 ref. (F23, Q23)

62-F. 60-Cycle Induction Heating for Forging and Extrusion. John A. Logan. *Industrial Heating,* v. 22, Feb. 1955, p. 282 + 14 pages.
Specialization and developments in the heating of ferrous and nonferrous metals. Photographs, graphs, diagram. (F21, F22, F24, J2, Al, Mg, Cu, SS, AY)

63-F. Hot Rolling. Z. Wusatowski. *Iron & Steel,* v. 28, Feb. 1955, p. 49-54.
Evaluation of factors influencing draft, spread and elongation of steel during rolling. Diagrams, graphs, tables. 18 ref. (To be continued.) (F23, ST)

64-F. Hot Rolling With the Planetary Mill. H. M. Walter. *Iron & Steel,* v. 28, Feb. 1955, p. 68-71.
Fundamentals of Sendzimir rolling mill and theory of its operation. Diagrams, photographs. (To be continued.) (F23)

65-F. The Modern Continuous Weld Pipe Mill. L. V. Johnson. *Iron and Steel Engineer,* v. 32, Feb. 1955, p. 70-75; disc., p. 75.
Equipment and operating procedures. Photographs. (F26, K general, CN)

66-F. Mechanical Features of Great Lakes 45 × 90-In. Universal Slabbing Mill. Phillip C. Vetter. *Iron and Steel Engineer,* v. 32, Feb. 1955, p. 112-116; disc., p. 116.
Equipment and operating characteristics. Photographs. (F23)

67-F. Electrical Features of Great Lakes 45 × 90-In. Universal Slabbing Mill. Harold C. Hoeft. *Iron and Steel Engineer,* v. 32, Feb. 1955, p. 117-121; disc., p. 121-122.
Drive and its auxilliary equipment. Photographs, circuit diagrams, graphs. (F23)

68-F. The Rolling of Metals and Alloys. III. E. C. Larke. *Sheet Metal Industries,* v. 32, no. 334, Feb. 1955, p. 139-144.
Methods of thickness control. Photographs, tables, graph, 14 ref. (To be continued.) (F23)

69-F. (German.) **Flame Shaping and Straightening.** Richard Pfeiffer. *Schweisstechnik,* v. 8, no. 11, Nov. 1954, p. 128-131.
Principles and rules; relationship between heat, stress and deformation and equipment. Photographs, diagrams. (To be continued.) (F29, G22)

70-F. (German.) **Recent Investigations on the Drawing and Pushing-In of Steel Bars. I.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 3, Feb. 10, 1955, p. 162-169.
Present state of development in the bright drawing of steel bars. Micrographs, table, graphs. 15 ref. (F27, CN)

71-F. (German.) **Experiences in the Rolling and Rerolling of Wide Strip in Multiple-Stand Cold Rolling Mills.** Vincenz Seul and Joseph Billigmann. *Stahl und Eisen,* v. 75, no. 3, Feb. 10, 1955, p. 144-162.
Characteristics of German equipment and operating practice. Tables, photographs, graphs, diagrams. 105 ref. (F23, CN)

72-F. (German.) **Thermal and Mechanical Stresses on Extrusion Dies.** Kurt Laue. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 1-6.
Survey of basic stress computations; principles of selection of suitable materials; extrusion characteristics of typical magnesium, aluminum, zinc, and copper alloys and special steels. Graphs, photograph, tables. (F24, TS, Mg, Al, Zn, Cu, AY)

73-F. (German.) **Ultrasonic Shrink-Fit Testing of Ingot Receptacles for Extrusion Presses.** Max Hetzler and Alfred Michalski. *Zeitschrift für Metallkunde,* v. 46, no. 1, 1955, p. 6-11.
Testing the fit of shrunk-on receptacle reinforcements; factors which influence the evaluation of results. Diagrams, graphs, photographs. 4 ref. (F24, S14, TS)

74-F. (Russian.) **Force Relations During Blooming.** E. S. Rokotian. *Vestnik Mashinostroeniia,* v. 35, no. 1, Jan. 1955, p. 25-29.
Formulas for calculating rolling pressures and other factors. Graphs, tables. 3 ref. (F23, ST)

75-F. (Book.) **Fundamentals of the Working of Metals.** G. Sachs. 158 p. 1954. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. $4.75.
Basic phenomena which determine the performance of metallic materials during mechanical working. (F general, G general)

76-F. (Polish.) **Materials Standards for Forging.** Wieslaw Wroblewski. *Hutnik,* v. 21, no. 12, Dec. 1954, p. 395-399.
Principles and equations for efficient utilization of rods and billets used in forging and stamping. Table. 5 ref. (F22)

77-F. High Speed Heating of Steel for Plastic Deformation. E. G. de Coriolis. *Blast Furnace and Steel Plant,* v. 43, Mar. 1955, p. 320-324, 351.
Factors influencing the maximum rate of heating billets in gas-fired furnaces. Graphs, tables. 7 ref. (F1, ST)

78-F. Stretch-Flattening of Large Sheets and Plates. Hydraulic Machine With 800-Ton Pull. *Engineering,* v. 179, Mar. 4, 1955, p. 282-284.
Equipment and operation procedures. Diagrams, photographs. (F29)

79-F. The Production of Light-Alloy Drop-Forgings, Their Heat-Treatment, Inspection, and Testing. W. T. Edmunds and R. C. Lloyd. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 247-261 + 2 plates.
Comparison of different types of aluminum alloy forging stock; effects of heat treatment; methods of inspection and types of defects; relationship between macrostructure, microstructure, and mechanical properties of forgings. Tables, graphs, diagrams, photographs, micrographs. 7 ref. (F22, J general, S general, Al)

80-F. Hot Rolling. A Study of Draught, Spread and Elongation. Z. Wusatowski. *Iron & Steel,* v. 28, Mar. 1955, p. 89-94.
Coefficient of spread and roll pass design calculations. Graphs, tables. (F23)

81-F. The Rolling of Metals and Alloys. IV. Resistance to Deformation and Other Factors Which Determine the Magnitude of the Rolling Load. E. C. Larke. *Sheet Metal Industries,* v. 32, no. 335, Mar. 1955, p. 217-222, 224.
Effects of roll surface condition and initial strip thickness. Diagrams, micrographs, graphs. 12 ref. (To be continued.) (F23)

82-F. The State of Lubrication in Wire Drawing Operations. R. Tourret. *Wire and Wire Products,* v. 30, Mar. 1955, p. 299-303, 347.
Tests of wiredrawing lubricants to determine the effects of pressures and temperatures on dies and on the aluminum, brass, copper and steel wire being drawn. Graphs, diagram, photograph, tables. 26 ref. (F28, CN, Cu)

83-F. Graphic Analysis of the Relation Between the Wire and Capstan Speeds on Multiple Wire-Drawing Machines. J. A. Giaro. *Wire and Wire Products,* v. 30, Mar. 1955, p. 305-312.
Graphic method for determining relative speeds of drawing capstans in terms of die diameters. Chart, diagrams. 11 ref. (F28)

84-F. (French.) **Comparative Examination of Different Systems of Hot Deformation.** Giovanni Dallapicola. *Métallurgie et la construction mécanique,* v. 87, no. 2, Feb. 1955, p. 129, 131, 133.
Hand, hammer, press and automatic forging. Drawings, micrographs, table. (F22)

85-F. (German.) **Flame Straightening.** Richard Pfeiffer. *Schweisstechnik,* v. 8, no. 12, Dec. 1954, p. 133-141.
Economic considerations; applications. Photographs. 4 ref. (F29)

86-F. Considerations for Selecting Steel Extrusions. S. O. Evans. *Metal Progress,* v. 67, Apr. 1955, p. 91-95.
Ugine-Séjournet extrusion process involving use of molten glass as a lubricant. Diagrams. (F24, ST)

87-F. The Rolling of Metals and Alloys. IV. Resistance to Deformation and Other Factors Which Determine the Magnitude of the Rolling Load. E. C. Larke. *Sheet Metal Industries,* v. 32, no. 336, Apr. 1955, p. 299-304, 306.
Influence of roll diameter, resistance to deformation, influence of rate of deformation, temperature of

rolling and effect of coiler and decoiler tension. Diagram, graphs, tables. 5 ref. (To be continued.) (F23)

88-F. (French.) **New Constructions in Rolling Mills.** Neumann. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 3, 1955, p. 609-632.

Safety apparatus for rolling mills and auxiliary equipment. Diagrams. (F23, A7)

89-F. (French.) **Comparative Examination of Different Systems of Hot Deformation.** Giovanni Dallapicola. *Métallurgie et la construction mécanique,* v. 87, no. 3, Mar. 1955, p. 197, 199, 201.

Rolling, circular hammering, upsetting of pieces reheated by electrical resistance and forging and stamping of pieces reheated by high-frequency induced currents. Micrographs, diagram. (F22, F23, G3)

90-F. (French.) **Forged and Stamped Aluminum Alloy Pieces. I.** Robert Colomb. *Revue de l'aluminium,* v. 32, no. 218, Feb. 1955, p. 167-176.

Obtaining one-piece parts that are strong, light, impervious to gases and liquids, easy to machine and highly resistant to corrosion. (To be continued.) (F22, G3, Al)

91-F. (German.) **Power Requirement and Forming in Extrusion and Die-Forging.** A. Geleji. *Acta Technica Academiae Scientiarum Hungaricae,* v. 10, nos. 1-2, 1955, p. 187-220.

Verification of theory of extrusion, formerly established by the author; calculation of forces developed in die forging. Diagrams, graphs, photographs. 14 ref. (F22, F24)

92-F. (German.) **Determination of Characteristics of Static and Dynamic Load in Single-Stand Rough Plate Rolling Mill by Calculation and Experiments.** Karl-Heinz Lucas and Otto Emicke. *Metallurgie und Giessereitechnik,* v. 5, no. 1, Jan, 1955, p. 7-18.

Theoretical analysis resulting in formulas corroborated by experimental investigation. Diagrams, tables, photographs. 13 ref. (F23)

93-F. (German.) **Problem of Static and Dynamic Loads in Rough Plate, Two-High, Reversible Rolling Mills and in Their Drives as a Basis for Their Effective Design and for Determination of Their Efficient Inspection Method.** Otto Emicke. *Metallurgie und Giessereitechnik,* v. 5, no. 1, Jan. 1955, p. 19-34.

Structural analysis. Relation between construction details and wear and tear. Diagrams, graphs, tables, photographs. 26 ref. (F23)

94-F. (German.) **Problem of the Formation of Surface Defects on Aluminum Sheets.** Roland Funk. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 180-182.

Relation between nonhomogeneity of the sheet surface and condition of rolling. Diagrams, photographs. 8 ref. (F23, Al)

95-F. (Russian.) **Stress Distribution in Metal During Forging of Shafts and Bars.** E. P. Unksov and V. M. Zavartseva. *Vestnik Mashinostroeniia,* v. 35, no. 3, Mar. 1955, p. 42-48.

Photo-elastic studies, technique of plotting diagrams. Photographs, diagrams, tables. 3 ref. (F22, Q25)

96-F. (Russian.) **Formation of Internal Flaws During Transversel Forging.** V. S. Smirnov. *Vestnik Mashinostroeniia,* v. 35, no. 3, Mar. 1955, p. 49-53.

Causes and methods of prevention. Graphs, table, diagrams, photographs. 3 ref. (F22)

97-F. Substitutes for Palm Oil in the Cold Rolling of Steel. W. R. Johnson, J. P. Sheehan, and Harry Schwartzbart. *Blast Furnace and Steel Plant,* v. 43, Apr. 1955, p. 415-423.

Development of a substitute lubricant for use in cold rolling of steel. Tables, graphs. 2 ref. (F23, F1, ST)

98-F. Precision Finishing Techniques for Magnetic Alloys. A. I. Nussbaum. *Electrical Manufacturing,* v. 55, May 1955, p. 106-111.

Final rolling, slitting and leveling of high permeability sheet. Diagrams, photographs, graphs, table. (F29, SG-n)

99-F. Wrought Carbon and Alloy Steel: Forging Characteristics. *Machine Design,* v. 27, May 1955, p. 172-175.

Production characteristics of various steels; guides for selection of forging metal. Tables, photographs. (F22, CN, AY)

100-F. Wrought Carbon and Alloy Steel: Hot Extrudability. Clark Church. *Machine Design,* v. 27, May, 1955, p. 179-182.

Advantages of extruded shapes; characteristics of extrudable ferrous and nonferrous alloys. Photographs, table. (F24, ST, SS, Ni, Ti)

101-F. Extrusions Put Squeeze on Costs. Robert M. Love. *Steel,* v. 136, May 9, 1955, p. 78-81.

Substituting extruded pieces for rotor wedges, instead of machining, results in low cost, fast delivery, superior physical properties and shapes dimensionally close to the

cross section of the finished product. Photographs, diagrams. (F24, AY, SS, Al, CN)

102-F. Which Frequency Do You Choose? *Steel,* v. 136, May 2, 1955, p. 126-128, 130.

Advantages of preheating by induction with low, high or dual frequency. Photographs, diagram, tables. (F21, CN)

103-F. Hot Extrusion at J & L—Solid Carbon Steel Sections Now in Production. *Steel Processing,* v. 41, Apr. 1955, p. 230-233, 256.

Plant will produce extrusions in solid sections which will range in weight from 1/3 lb. to 12 lb. per lineal ft., and up to 24 ft. in length. Photographs. (F24, CN)

104-F. High-Speed Generator Forgings. C. M. Laffoon. *Westinghouse Engineer,* v. 15, May 1955, p. 94-98.

Development and introduction of new and specialized inspection techniques and forging art improvements have made possible the production of large, high-quality rotor forgings for turbine generators. Photographs, diagram. (F22)

105-F. An Investigation of the Mechanics of Wire-Drawing. J. G. Wistreich. *Wire Industry,* v. 22, Apr. 1955, p. 421 + 6 pages.

Relation between external forces, boundary conditions of the process and plastic properties of the wire. Graphs, diagrams, tables, photograph. (F28)

106-F. (German.) **Investigations on Cold and Hot Rolling With Drag Roll and Determination of Roll Slippage by Means of the Forward Slip.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 7, Apr. 7, 1955, p. 391-401.

Development and application of the drag roll drive, test results, roll slippage and comparison of test results; equation to compute slippage. Micrographs, table, diagram, graphs, photographs. 21 ref. (F23, ST)

107-F. (German.) **The Use of the Magnetic Amplifier for the Quick Control of Rolling Mill Drives.** Joachim Wetzger. *Stahl und Eisen,* v. 75, no. 8, Apr. 21, 1955, p. 478-485.

Revolution and speed control of electric drives. Equipment and operating characteristics. Graphs, diagrams, photographs. (F23)

108-F. A New Approach to Metal-Forming Problems. E. G. Thomsen. *ASME, Transactions,* v. 77, May 1955, p. 515-521; disc., p. 521-522.

Describes method, gives stress and strain-rate distribution within a billet during an inverted extrusion process of a tube using commercially pure lead. Photographs, graphs, diagrams. 4 ref. (F24, Q24, Pb)

109-F. Wire-Drawing Machines for Steel Wire. H. Richards. *Iron and Steel Institute, Journal,* v. 180, May 1955, p. 60-65.

Types of wire drawing machine in use in the United Kingdom. Possible future developments towards increased speed and efficiency. (F28, ST)

110-F. Arc-Cast Molybdenum—Ingot to Bar, Sheet or Wire. N. L. Deuble. *Metal Progress,* v. 67, May 1955, p. 89-92.

Workability of ingots is determined largely by the molybdenum melting process. Photographs. (F general, Mo)

111-F. The Fabrication of Arc-Melted Ingots of Titanium and Titanium-Manganese Alloys Into Plate. R. W. Huber, V. C. Petersen and R. C. Wiley. *U. S. Bureau of Mines, Report of Investigations* 5117, Mar. 1955, 35 p.

Various steps in fabricating the materials into finished plate; comparative mechanical tests; response of the titanium-manganese alloy to various heat treatments. Graphs, tables, micrographs. 8 ref. (F23, Ti, Mn)

112-F. Experimental Extrusion of Aluminum Cable Sheath at Bell Telephone Laboratories. G. M. Bouton, J. H. Heiss and G. S. Phipps. *Bell System Technical Journal,* v. 34, May 1955, p. 529-561.

New techniques for extruding directly over paper insulated cable core at low temperature and pressure. Graphs, micrographs, diagrams, photographs, table. 8 ref. (F24, Al)

113-F. Application of Statistical Methods to Gauge Control in Rolling Aluminium Sheets. T. Bose. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 137-143.

Control of gage variation at final rolling stage. Tables, diagrams. (F23, S12, Al)

114-F. Fabrication of Titanium Components. Arnold S. Rose. *Jet Propulsion,* v. 25, May 1955, p. 212-216, 234.

Titanium alloys; forming operations; forging; spinning; welding. Photographs, graphs, diagrams. (F general, G general, K general, Ti)

115-F. Extrusion Through Wedge-Shaped Dies, I-II. W. Johnson. *Jour-*

nal of the Mechanics and Physics of Solids, v. 3, Apr. 1955, p. 218-230.

Experimental data of the steady-state pressure for the direct extrusion of sheet under strain conditions through square and wedge-shaped dies. Variation of extrusion pressure with friction, for selected reductions of small angle dies. Diagrams, graphs. 7 ref. (F24)

116-F. Two Decades of Progress in Drop Forging. H. J. Merchant. *Metal Treatment and Drop Forging,* v. 22, May 1955, p. 211-218.

Developments and advances made in the forging industry. Photographs, diagrams. 15 ref. (To be continued.) (F22)

117-F. Procedures for Forming Stainless Steel Tubing. *Metal-Working,* v. 11, June 1955, p. 14-16.

Methods of forming, reducing, expanding, flaring and rolling threads. Diagrams, photographs. (F26, SS)

118-F. Giant Forge Presses Go Into Action. *Modern Metals,* v. 11, May 1955, p. 84, 86, 88.

Large hydraulic units for production of aluminum aircraft forgings. Photographs, diagram. (F22, Al)

119-F. Steel Shell Manufacture. Arthur F. MacConochie. *Ordnance,* v. 39, May-June 1955, p. 995-998.

Considers pros and cons of hot forging and cold forming. Table, photograph, diagram. (F22, G4)

120-F. (French.) **The Study of Forgeability.** Very. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 12, no. 4, 1955, p. 783-800.

Control of forgeability of stainless and high temperature steels, and a new type of testing equipment for determining forgeability. Photographs, tables, diagrams. (F22, SS)

121-F. (Polish.) **The Principles of Fastening Dies in Hammers.** Wieslaw Wroblewski. *Hutnik,* v. 22, no. 1, 1955, p. 13-20.

Designs of drop hammers and dies, types of locking arrangements, wedges and inserts. Design factors consider function, size of hammer, strength of blow, hardness and types of steel. Diagrams, tables. 6 ref. (F22, ST)

122-F. Cold Reduction Facilities at Fairless Works. Robert R. Shedd. *Iron and Steel Engineer,* v. 32, May 1955, p. 55-62; disc., p. 62-63.

Plant layout, operating economies, equipment details. Diagrams, tables, photographs. (F23, CN)

123-F. Plate Mill Design and Rolling Practice. Elmer Lynch. *Iron and Steel Engineer,* v. 32, May 1955, p. 91-95; disc. 95-96.

Plate mill consists of a 24 x 36 x 116-in., three-high rougher and a 36 x 54 x 130-in., four-high finishing mill; slabs are kept in process in both mills simultaneously; some plates can be finished on the three-high mill and the combination gives excellent operating flexibility. Tables, photographs. (F23, CN)

124-F. Characteristics of Tandem Mill Drives. R. G. Beadle. *Iron and Steel Engineer,* v. 32, May 1955, p. 97-102; disc., p. 102-103.

Developments in electrical equipment. Comparison of two magnetic amplifier systems. Diagrams, graphs, table. (F23, CN)

125-F. Screwdown Lubrication. William A. Holt. *Iron and Steel Engineer,* v. 32, May 1955, p. 119-120; disc., p. 120-121.

Use of lead naphthenate lubricants on rolling mill screwdown screws and nuts. (F23)

126-F. Induction Heating of Ingots Proved Practical for Rolling. M. C. D. Hobbs. *Iron and Steel Engineer,* v. 32, May 1955, p. 123-124, 126, 129.

Induction heating and materials handling equipment for rolling mill. Photographs, diagram, table. (F21, F23, CN)

127-F. Problems of Forging Aluminium. *Machinery Lloyd (Overseas Ed.),* v. 27, May 7, 1955, p. 93-95.

Maintaining internal stresses at a minimum value by quenching in water with temperature above 85° C. Diagrams, photographs, graphs. (F22, Al)

128-F. G.F.M. Precision Forging Machines. *Machinery (London),* v. 86, May 13, 1955, p. 1028-1030.

Hot forging machine for forming the flutes in carbon steel and high speed steel taps ranging from ⅜ to 1 9/16 in. diam. Photographs. (F22, ST)

129-F. Arc-Cast Molybdenum—Fabrication of Parts. N. L. Deuble. *Metal Progress,* v. 67, June 1955, p. 101-105.

General characteristics that govern mechanical properties and successful working methods. Photographs, table, diagram. 6 ref. (F general, G general, Q general, Mo)

130-F. Lubricants for Wiredrawing. A. L. H. Perry. *Scientific Lubrication,* v. 7, May 1955, p. 14-18.

Advances have required improved drawing lubricants, and future increases in drawing speeds likewise largely depend on improving lubri-

cants still further. Photographs. 5 ref. (F1, F28)

131-F. Upset Forgings. Modern Methods and Design. I. M. W. Lamprecht. *Steel Processing,* v. 41, May 1955, p. 295-304.

Use of forged products, steps to be followed in manufacturing dies, single and multiple operations, high explosive shell cases. Table, diagrams. (F22)

132-F. (Czech.) **Change of Tube Wall Thickness in Drawing.** Bohumil Pocta. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 194-200.

Results show that the change of wall thickness depends on the ratio between wall thickness and tube diameter before drawing. Table, graphs, diagrams. 6 ref. (F26)

133-F. (French.) **Forged and Stamped Parts of Aluminum Alloys. II. Forging.** Robert Colomb. *Revue de l'aluminium,* v. 32, no. 219, Mar. 1955, p. 281-296.

Techniques for A-U4G, A-S12UN and A-U2GN alloys of different structural parts and their mechanical characteristics. Tables, diagrams, photographs. (F22, G3, Al)

134-F. (Russian.) **Economic Efficiency of the Induction Heating of a Metal During Drop Forging on Crank-Driven Presses.** V. S. Bialkovskaia. *Vestnik Mashinostroeniia,* v. 35, no. 5, May 1955, p. 72-77.

Comparison of costs of induction heating and flame heating under various conditions and for various machine parts. Oil, natural gas and producer-gas costs. Tables, graph. (F21, F22, ST)

135-F. Sixty-Cycle Induction Heating of Large Steel Sections for Hot Forming. IV. C. H. Hartwig. *Industrial Heating,* v. 22, May 1955, p. 952, 954, 956, 958.

Effects of larger air gap and increased power input on temperature, power and current curves. Table, diagrams. (To be continued.) (F21)

136-F. Successful Modernization of Soaking Pits. H. W. Hodges. *Industrial Heating,* v. 22, May 1955, p. 983-984, 986.

Improvements made and benefits derived. Photographs. (F21)

137-F. Practical Aspects of the Cold-Rolling of Narrow Steel Strip. T. W. Hood. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 189-200 + 2 plates.

Practices in the cold rolling of narrow strip in mild, high-carbon, and stainless steels. Hydraulically loaded mills are specially mentioned, with practical problems such as coolant, rolls, roll grinding, rollneck bearings, etc. Table, diagrams. 9 ref. (F23, CN, SS)

138-F. Precision Forging of Jet-Engine Blades. Edward B. Wells. *Machinery,* v. 61, June 1955, p. 192-199.

Vacuum melting of heat resistant alloys. electrical resistance upsetting of billets, induction and high-speed gas heating and impacting are some of the latest developments employed in the production of compressor blades and turbine buckets for jet engines. Photographs. (F22)

139-F. (English.) **A Note on the Calculation of the Cross-Section of the Buffer of a Bloom Shears.** L. Gascuel. *Acier, Stahl, Steel,* v. 20, No. 4, Apr. 1955, p. 171-172.

Includes diagrams, photograph. (F29)

140-F. (German.) **The New Blooming Mill of the Böhler & Co., AG, at Kapfenberg.** Guido Bersa and Stefan Glavitza. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 624-629.

Description of blooming mill, breaking down mill, auxiliary plants, furnaces and electrical equipment Lubricating, descaling, operation of the mills and operational results. Photographs, diagrams. 2 ref. (F23, ST)

141-F. (Hungarian.) **Calculation of the Curving of Rolls.** Elemér Köves. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 222-226.

Calculation examples made with duraluminum ingots during hot rolling, taking into consideration rolling pressure and heat expansion of the rolls. Diagrams, graphs, tables. 21 ref. (F23, Al)

142-F. Best Reel Performance Is Obtained When Current Regulator Operates on the Generator. A. J. Winchester. *Blast Furnace and Steel Plant,* v. 43, June 1955, p. 647-649.

Winding reel control on hot and cold mills in the metalworking industry. Diagrams, graphs, photograph. (F23)

143-F. The Metallurgical Control of High-Quality Aluminium Forgings. T. E. Murch. *Engineers' Digest,* v. 16, May 1955, p. 237-238, 243.

Outlines methods whereby light-alloy forging industry endeavors to maintain requirements of the aircraft industry. Photographs. (F22, Al)

144-F. Sixty-Cycle Induction Heating of Large Steel Sections for Hot

Forming. V. C. H. Hartwig. *Industrial Heating,* v. 22, June 1955, p. 1160, 1162, 1164, 1166.

Equipment and accessories for heating ingots to forging temperatures. Diagrams. (F21, ST)

145-F. Manufacture and Properties of Large Forgings. Adolph O. Schaefer. *Industrial Heating,* v. 22, June 1955, p. 1168 + 10 pages.

Composition of forging alloys; applications; production problems. Tables, photographs, diagrams. (To be continued.) (F22, AY)

146-F. New Merchant Bar Mill Equipped for Maximum Versatility. R. A. Peterson. *Iron Age,* v. 175, June 9, 1955, p. 85-87.

Mill consists of a reheating furnace, primary three-high breakdown mill, intermediate mill unit of four two-high stands, and finishing mill unit with two two-high stands in staggered arrangement. Photographs. (F23, ST)

147-F. How to Improve the Quality of Deep Drawing Steel. E. R. Morgan and J. C. Shyne. *Iron Age,* v. 175, June 23, 1955, p. 91-94.

Avoidance of strain aging and stretcher strains by control of composition, omission of temper rolling before shipping, or stabilization of dissolved nitrogen. Diagrams, graphs. (F23, N7)

148-F. Modern Rolling Mills Aid Study of High Strength Materials. J. I. McMartin. *Iron Age,* v. 175, June 23, 1955, p. 104-106.

Equipment and operating details of heavier, sturdier laboratory rolling mills, offering greater control and increased flexibility to meet modern metallurgical needs. Improved mills designed to handle new high-hardness and high-strength materials. Photographs. (F23)

149-F. Rolling of Shapes in Alloy and Tool Steel Grades. Ernest E. Davis and A. H. Highley. *Iron and Steel Engineer,* v. 32, June 1955, p. 59-64; disc., p. 64-66.

Pass designs for a given alloy and a given section, rolling details. Typical sections. Diagrams, photograph. (F23, AY)

150-F. Operation of Magnetic Amplifier Controlled Tandem Mills. J. C. Peth and J. W. Brinks. *Iron and Steel Engineer,* v. 32, June 1955, p. 69-76; disc., p. 76-77.

Advantages of magnetic amplifiers over rotating types. Components, operation and maintenance of magnetic amplifiers. Photographs, diagrams, graphs, table. (F23)

151-F. Effect of Certain Primary Mill Heating and Rolling Practices on Slab Surface Quality. H. B. Wishart and C. A. Hope. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 811-812.

Three factors of processing variables, amount of reduction between ingot and slab, slab finishing temperatures, influence of roll changes. Photographs, graphs. (F23, ST)

152-F. Extrusion of Aluminium. I. G. Slater. *Metal Industry,* v. 86, June 3, 1955, p. 464-468.

Extrusion presses, extrusion dies, furnaces, impact extrusion, future outlook. Table, photographs. (F24, G5, Al)

153-F. Rolling Aluminium. R. T. Staples. *Metal Industry,* v. 86, June 3, 1955, p. 468-471.

Survey of the scope of sheet rolling in the aluminum industry. Graph, tables, photograph. (F23, Al)

154-F. Aluminium Forgings. E. W. Peel. *Metal Industry,* v. 86, June 3, 1955, p. 472-475.

Use in aircraft design and other industries where there is a demand for the high strength, ductility, soundness, dimensional accuracy, and other qualities of the light-alloy die forgings. Photographs. (F22, Al)

155-F. The Rolling of Metals and Alloys. V. A Practical Method of Calculating Rolling Loads and the Establishment of Rational Rolling Schedules. E. C. Larke. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 459-464.

Use of practical method of calculating rolling loads, and a demonstration, by examples, of its application to the analysis and design of rolling schedules when no coiler or decoiler tension is employed. Graphs, tables. 8 ref. (F23)

156-F. Press Plant Specially Built for Large Aircraft Forgings. *Steel Processing,* v. 41, June 1955, p. 349-360.

Equipment and operating procedures of Aluminum Co. of America's 35,000 and 50,000-ton forging presses. Photographs, diagrams, table. (F22, Al)

157-F. Upset Forgings. Modern Methods and Design. II. M. W. Lamprecht. *Steel Processing,* v. 41, June 1955, p. 367-374, 390-391.

Forging of tubing and gear blanks, unusual multiple operation forging. Diagrams. (F22)

158-F. Aluminum Cold Forgings. R. A. Quadt. *Western Machinery and Steel World,* v. 46, June 1955, p. 82-84.

Value in industry for high production, design simplification, cost reduction. Table, photographs.
(F22, A1)

159-F. Measurement of Temperature in the Drawing of Bar and Wire Stock and the Problem of Supercritical Drawing Speeds. W. Reichel. *Henry Brutcher Translation No.* 2670, 17 p. (From *Stahl und Eisen,* v. 70, no. 25, 1950, p. 1141-1146.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 20-F, 1951.
(F27, F28, S16, ST)

160-F. (German.) **Swedish Intermediate. Small Section and Wire Rolling Mills of Novel Design.** Erik M. Norlindh. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 700-709.

Design of a multiple-purpose mill train for medium and fine steel sections as well as for wire rod. Roller guides, repeaters, looping channels, grease bath couplings, three-high and interchangeable two-high housing chucks, chucks for vertical rolls. Diagrams, photographs. 2 ref. (F27, F23, ST)

161-F. (German.) **Effect of Increased Requirements as to Output and Quality on the Design, Operation, and Control of Rolling Mill and Forge Furnaces.** Berthold von Sothen. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 709-718.

Causes, kinds and extent of the requirements to be met by heating, annealing and heat treating furnaces. Correlations between furnace capacity, heat absorbing power, heat transmission and products to be heated. The process of heating, heating time, temperature-time curves of heating, through-heating, loss by burning, skin decarburization, condition of scale, features of development of the design. Diagrams, photographs. 15 ref. (F21, J23)

162-F. (German.) **Comparison Tests on the Work Hardening in Flat Rolling and Drawing of Round Wire.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 757-767.

Effects of the wire material, of the roll diameter and of the reduction on the work hardening in flat rolling. Interpretation of the differences determined in work hardening. Diagram, tables, graphs, micrographs. 20 ref. (F23, F28)

163-F. (German.) **The Aptitude of Different Emulsions to the Cold Rolling of Steel Strip.** Hans Pannek. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 767-769.

Characteristics, execution and results of tests and conclusions drawn from the operation. Tables.
(F23, ST)

164-F. (German.) **Recent Investigations on the Drawing and Extrusion of Steel Bars. II.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 769-776.

Effect of working conditions on deformation, effect of the bearing length on power required in drawing and on swelling under different working conditions. (F27, ST)

165-F. (German.) **Production of Extremely Thin Metal Wires.** H. Bittel. *VDI Zeitschrift,* v. 97, nos. 15-16, May 15, 1955, p. 486-488.

Electrolytic methods of reducing the diameters of wires. Diagrams, graphs. 7 ref. (F28)

166-F. (Polish.) **Position of the Neutral Angle in Hot and Cold Rolling Processes.** Zygmunt Wusatowski. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 11-42.

Analysis, verification, amplification of various formulas for the neutral angle; equations for homogeneous compression and slipping friction along contacting arc. Formulas for cold rolling without tension and hot rolling without spreading. Tables, graphs. 16 ref. (F23)

167-F. (Polish.) **Modern Methods of Rolling Rods Into Rivets and Bolts.** Roman Wusatowski. *Wiadomosci Hutnicze,* v. 11, no. 1, Jan. 1955, p. 4-14.

New and old rolling machines and techniques compared; machine designs, roll types, groove designing; roller pressures, heating methods, thread rolling. Photographs, diagrams. 11 ref.
(F23, G11, G12, CI, AY)

168-F. (Polish.) **How to Lower the Operating Costs of the Rolling Mill.** Karol Jelonek. *Wiadomosci Hutnicze,* v. 11, no. 1, Jan. 1955, p. 15-18.

Effect of calorific value of gas and amount of excess air on heating furnace efficiency; economic aspects of billet size and weight. Table, graphs. (F23)

169-F. Extruded Low Carbon Steels. R. L. Hugo. *Product Engineering,* v. 26, July 1955, p. 129-131.

Hydraulic presses extrude glass-coated billets through low-cost dies, producing complex sections with final dimensions equal to AISI cold finished bar tolerances. Current size limitations, typical applications, properties obtainable. Photographs.
(F24, CN)

170-F. Large Forgings — Current German Viewpoints on Design and

Production. H. Gummert. *Steel Processing,* v. 41, July 1955, p. 421-425.

Raw materials, heat treatment, working and shaping, testing procedures, machinery for production of forgings. Tables, diagrams. 3 ref. (F22)

171-F. Unusual Drop Forging of Crawler Tractor Truck Wheels. Charles E. Warner. *Steel Processing,* v. 41, July 1955, p. 433-434.

Forging of wheels from 46-lb. slugs. Slugs are heated in an oil-fired furnace and forged in two operations. Photographs. (F22)

172-F. (Norwegian.) **Metallurgical Viewpoints on the Production of Copper Tubing.** Olav Jore. *Tidsskrift for Kjemi, Bergvesen og Metallurgi,* v. 15, no. 4, 1955, p. 60-70.

Consideration of hydrogen, oxygen and sulfur contents in the melting and casting of copper; methods and equipment for extruding and rolling copper tubing; effect of cold drawing on structure. Diagrams, graphs, photographs, micrographs. 14 ref. (F26, E25, Cu)

173-F. (Polish.) **Hammers and Presses for Drop or Press Forging Heavy Pieces.** Wieslaw Wroblewski. *Hutnik,* v. 22, no. 4, Apr. 1955, p. 127-130.

Characteristic design features, advantages, disadvantages and dimensions of the largest present-day drop-forging hammers and presses. Table, diagrams, photograph. 9 ref. (F22)

174-F. (Polish.) **Trials to Adapt Metal Flow Formulas to the Roll Pass Design.** Z. Wusatowski and R. Wusatowski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 115-123.

Formula, applicable to alloyed steels, and under varying rolling conditions, made possible by introducing correction coefficients. Modifications of the formula are derived for calculating irregular sections. Diagrams, nomograms. 11 ref. (F23, AY)

175-F. Detroit Steel Corporation's Multiple-Fueled Soaking Pits. F. C. McGough. *Iron and Steel Engineer,* v. 32, July 1955, p. 55-61; disc., p. 61-64.

Practicality of firing circular-type pits with low calorific mixed gas and preheated combustion air with burners which can also handle richer gases. No adverse effects were noticed on mill operations and definite savings were accomplished from the use of blast furnace gas. Photographs, diagrams. (F21)

176-F. Performance Factors Affecting Bar Mill Cooling Bed Arrangement. E. C. Peterson. *Iron and Steel Engineer,* v. 32, July 1955, p. 65-74.

Most common factors are ability of the bed to discharge bars from the mill runout table as well as to cool the mill production and ability of the cold bar shear to dispose of the cooled bars. Photographs, graphs, tables. (F23)

177-F. Continuous Drawing of Cold Finished Bars. Walter J. Prochak. *Iron and Steel Engineer,* v. 32, July 1955, p. 95-98.

Continuous operation reduces handling, increases yield, lessens maintenance, practically eliminates hazards and reduces operating crew by about 40%. Photographs. (F27, ST)

178-F. Two Decades of Progress in Drop Forging. H. J. Merchant. *Metal Treatment and Drop Forging,* v. 22, June 1955, p. 251-254.

Progress made in materials, methods of manufacture and utilization of forging dies and tools during the past 20 yr. Photographs. 7 ref. (F22, AY)

179-F. Impacting Makes Western Debut at Hycon. Harry A. Kirkpatrick. *Western Metals,* v. 13, July 1955, p. 46-48.

"Impacting", a relatively new forging process which permits "drop forging" in mid-air. This method requires less energy, compared with other forging processes, and works stock equally from two opposing sides. Photographs. (F22, Al)

180-F. Mechanical Working of Beryllium by Extrusion. P. Loewenstein, A. R. Kaufmann and S. V. Arnold. Paper from "The Metal Beryllium". American Society for Metals, p. 241-261.

Present day techniques, study of variables, special problems of powder and bare extrusion. Diagrams, X-rays, graphs, photographs. 5 ref. (F24, Be)

181-F. Mechanical Working of Beryllium by Rolling, Forging and Similar Processes. Shields M. Bishop. Paper from "The Metal Beryllium". American Society for Metals, p. 262-272.

Rolling of metal fabricated by various methods, forging and hot coining and swaging. Photographs, graph. 28 ref. (F22, F23, F25, Be)

182-F. The Control of Quality in the Hot and Cold Rolling of Alu-

minium and Aluminium Alloys. F. King and A. N. Turner. Paper from "The Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. Pt. II. The Control of Quality in Working Operations". Institute of Metals Monograph and Report Series No. 16, p. 15-30 + 1 plate.

Theoretical and practical implications of the control of the tensile strength, bending and pressing properties, corrosion-resistance and surface finish of aluminum alloy sheet and strip. Effect of fabricating process on properties. Graphs, photograph, table, micrographs. 10 ref. (F23, Al)

183-F. The Control of Properties and Structure in the Hot and Cold Rolling of Copper and Copper-Base Alloys. W. W. Kee. Paper from "The Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. Pt. II. The Control of Quality in Working Operations". Institute of Metals Monograph and Report Series No. 16, p. 31-46 + 1 plate.

Methods of controlling grain-size, directionality, shape, gage and surface quality; influence of impurities on processing and structure. Graphs, photograph, tables, micrographs. 24 ref. (F23, Cu)

184-F. Some Factors Affecting the Quality of Extrusions. Christopher Smith and Norman Swindells. Paper from "The Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. Pt. II. The Control of Quality in Working Operations". Institute of Metals Monograph and Report Series No. 16, p. 47-57.

The practice of extrusion discussed in light of its effects on the quality of copper and aluminum alloy products made by this process. Tables. 7 ref. (F24, Al, Cu)

185-F. (French.) **Forged and Stamped Parts of Aluminum Alloys. IV.** Robert Colomb. *Revue de l'aluminium,* v. 32, no. 221, May 1955, p. 497-507.

Obtaining of rounded angles, shape and depth of marks, fibering, asymetrical pieces, protrusions and marking of pieces. Diagrams, tables. (To be continued.) (F22, G3, Al)

186-F. Manufacture and Properties of Large Forgings. II. Adolph O. Schaefer. *Industrial Heating,* v. 22, July 1955, p. 1394 + 6 pages.

Cycle for heating a 116-in. ingot to forging temperatures and subsequent heat treating cycles. Photographs, tables, diagrams. (F22, J general, ST)

187-F. Integrated Fastener Setup Shortens Delivery Time. E. C. Beaudet. *Iron Age,* v. 176, Aug. 11, 1955, p. 92-94.

Ferrous and nonferrous billets are cast from induction furnaces, extruded into bar, rod and wire on a 1650-ton press, and extrusions are then drawn to size for fastener production. Photographs, micrographs. (F24, F27, T7)

188-F. Can Controlled Temperature Rolling Improve Drawability. N. P. Goss. *Iron Age,* v. 178, Aug. 11, 1955, p. 100-102.

Process rolls sheet at 500° F. and produces a random orientation. Transverse and longitudinal properties are more compatible and improved "drawability" is the results. Diagrams, diffraction patterns. (F23, G4, SS)

189-F. Induction Heating. M. C. D. Hobbs. *Iron & Steel,* v. 28, June 1955, p. 315-316, 318.

Advantages and applications of induction heating of ingots in preparation for the billet mill. Photographs. (F21, J2, ST)

190-F. Drawing Failures in Extruded Shells. Hubert J. Pessl. *Metal Progress,* v. 68, Aug. 1, 1955, p. 80-81.

Cause of a steadily increasing rate of drawing failures of cold extruded 75-mm. shells could not be found until the punch broke. Failure was due to fatigue originating at a "flake". Stresses in drawing had caused the punch to increase in diameter and pinch the shells. Photographs. (F24, S21, TS)

191-F. Measurement of the Pressure Distribution Between Rollers in Contact. G. J. Parish. *British Journal of Applied Physics,* v. 6, July 1955, p. 256-261.

Measurement of processes in which there is no fixed gap between rollers at low roll pressures. Diagrams, graphs, table. 4 ref. (F23)

192-F. Lead Extrusion at Various Speeds. Yuji Matsuura. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 65-68.

Effects of die angles, and reductions and extrusion rates on extrusion pressures. Graphs, photographs. (F24, Pb)

193-F. Surface Friction and Lubrication in Cold Strip Rolling. P. W. Whitton and Hugh Ford. *Institution of Mechanical Engineers, Proceedings,* v. 169, no. 5, 1955, p. 123-133 + 2 plates; disc., p. 133-140.

Method of measuring friction in the roll gap under the conditions of the cold rolling process without making use of any theory of the

distribution of roll pressure along the contact arc. Method and the friction coefficients so found used to compare calculated and measured values of roll force and torque. Diagram, tables, graphs, photographs, micrographs. 31 ref. (F23, F1, Q9, ST)

194-F. New Steel Tube and Pipe Mill Offers Variety of Specialty Products. P. M. Unterweiser. *Iron Age,* v. 176, Aug. 18, 1955, p. 75-78.

Calmes process, which provides an efficient means for piercing and elongating preheated ingots, is adaptable to both alloy and plain carbon steels and still produces remarkably tight wall tolerance and concentricity in an unusual range of sizes. Photographs, flowsheet. (F26, ST)

195-F. Manufacture of Drop Forgings in the Motor Industry. *Metal Treatment and Drop Forging,* v. 22, July 1955, p. 299-305.

Description of various divisions—die design and manufacture, material supply, various forms of forging plant, together with main ancillaries, heat treatment, cleaning, inspection and metallurgical control. Photographs, diagram. (To be continued.) (F22)

196-F. New Non-Scaling Gas-Fired Forge Furnace. *Metal Treatment and Drop Forging,* v. 22, July 1955, p. 306-308.

"Equiverse" system depends on a high CO content, hot (above 1000° C.) air atmosphere in the furnace. Design gives waste-gas temperature less than 200° C. Photographs, micrographs. (F21)

197-F. Aluminum Extrusions—From the Heavy Press Program. A. L. Hurst. *Product Engineering,* v. 26, Aug. 1955, p. 150-153.

Limitations in die design, production considerations, tolerances obtainable and applicable alloys, based on parts already produced by this equipment. Photographs, tables. (F24, Al)

198-F. (French.) **Problems of Manufacture and of Ultrasonic Examination of Heavy Press Forgings.** C. Roques, Ch. Dubois and P. Bastien. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 353-368.

Nature and cause of cracks in press forgings; influence of heterogeneities and metallurgical quality of the steel; problems of ultrasonic examination and necessary precautions. Tables, graphs, micrographs, photographs, diagrams. 11 ref. (F22, S13)

199-F. Hot Scarfing With a Mechanical Bloom Turner. A. B. Glossbrenner. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 77-80; disc., p. 80-81.

Description of system, how it works and some of the planning and preparation that preceded the installation. Photographs. (F21)

200-F. The 11-In. Rod Mill at Jones and Laughlin's Aliquippa Plant. N. A. Hansen. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 90-93; disc., p. 94-95.

Rod mill designed for three-strand operation at speeds up to 6400 ft. per min. Diagrams, photographs. (F27)

201-F. A Study of Failures in Iron Work Rolls. Charles F. Peck, Jr., and Frederic T. Mavis. *Iron and Steel Engineer,* v. 32, Aug. 1955, p. 121-127; disc., p. 127-131.

Temperature stresses in a roll during operation. Spalling seems to be due to high radial stresses set up in the roll by temperature conditions. Graphs, diagrams, table, photograph. 4 ref. (F23, S21, ST)

202-F. Aluminum Wire Drawing. Roger J. Schoerner. *Wire and Wire Products,* v. 30, Aug. 1955, p. 883 + 5 pages.

Some of the over-all aluminum wiredrawing activities on a domestic and world-wide basis. (F28, Al)

203-F. Tungsten Carbide Die Design for Drawing Aluminum Rods and Wire. Edgar T. Miller. *Wire and Wire Products,* v. 30, Aug. 1955, p. 886-887.

Factors of importance in designing dies for the drawing of aluminum wire and rod. Diagrams. (F27, F28, Al, W)

204-F. Some Comments on Dry Drawing of Aluminum Wire. Chester F. Wickwire. *Wire and Wire Products,* v. 30, Aug. 1955, p. 889, 940.

Comments on adapting steel-type drawing machinery to aluminum alloy materials. Types of lubricants and modification of finishing blocks. (F28, F1, Al)

205-F. Filtration of Lubricants for Aluminum Wire Drawing. H. T. Jones, Jr. *Wire and Wire Products,* v. 30, Aug. 1955, p. 890-893, 941.

Design, operation, construction and cleaning of a pressure leaf filter used on mineral oil die lubricants. Photographs, diagrams. (F28, F1, Al)

206-F. Fine Wire. Elmer E. Bonds. *Wire and Wire Products,* v. 30, Aug. 1955, p. 897-898, 944.

Methods of manufacture, different types and finishes, applications. (F28)

207-F. (Czech.) **Reasons for Rejects in Drop Forging and Methods of Decreasing the Number of Rejects.** Rudolf Hrivnak. *Hutnik,* v. 5, no. 6, June 1955, p. 176-180.
Types of defects analyzed. Diagrams. (F22)

208-F. (French.) **Operation of Soaking Pits. Their Regulation.** M. Woll. *Flamme et thermique,* v. 8, no. 82, July 1955, p. 31-40.
Installations and recent improvements in their regulation. Diagrams, graphs. (F21)

209-F. (Hungarian.) **What to Do About Negative Tolerance?** Frigyes Arkos. *Kohaszati Lapok,* v. 10, no. 7, July 1955, p. 289-295.
Problems of tolerance in rolled steel production, factors determining range of tolerance including temperature and condition of the rolls. Diagrams, graphs. (F23, ST)

210-F. (Hungarian.) **Some Problems of Wire Drawing.** Lajos Mankher. *Kohaszati Lapok,* v. 10, no. 7, July 1955, p. 295-307 + 2 plates.
Factors effecting quality, optimum drawing conditions, conditions conducive to defects. Tables, graphs. 8 ref. (F28)

211-F. **Manufacture of Drop Forgings in the Motor Industry.** *Metal Treatment and Drop Forging,* v. 22, Aug. 1955, p. 351-357.
Review of manufacturing stages of a number of typical drop-forged components, with special reference to the Austin A30. Photographs, diagrams. 4 ref. (F22)

212-F. (English.) **Wire-Drawing Alloy Steels.** *Aciers Fins & Spéciaux Francais,* 1955, no. 20, July, p. 49-52.
Review of a limited number of the more characteristics applications of special steels as wires, rods and strips. Tables, photographs. (F28, AY)

213-F. (French.) **Forged and Stamped Parts of Aluminum Alloys. V.** Robert Colomb. *Revue de l'aluminium,* v. 32, no. 222, June 1955, p. 627-641.
Examples of forged parts for compressors, engines and aircraft; processing details and properties of finished products. Photographs, diagrams, graphs, tables. (F22, G3, Al)

214-F. (French and German.) **Forging of the German Silver NS 50/7 Pb.** H. Bovet. *Pro-Metal,* v. 7, no. 45, June 1955, p. 516-519.
Effect of structure and temperature on the forging properties of German silver. Micrographs, photograph. (F22, Cu)

215-F. (German.) **Construction and Operation of Modern Forging Furnaces.** Karlheinz Niemeyer. *Stahl und Eisen,* v. 75, no. 16, Aug. 11, 1955, p. 1029-1035.
Features of forging furnace design, heating-up of forgings according to plan and desultory and plotting of characteristic curves for the determination of heating times and gas consumption. Tables, graphs, diagrams, photograph. 4 ref. (F22, F21)

216-F. (Russian.) **New Method of Testing the Plastic Properties of Metals at High Temperatures.** I. A. Fomichev. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 841-844.
Tests to establish optimum temperature conditions for helical rolling (rotary piercing) of seamless steel tubing. Diagrams, graphs, photographs. (F26, Q24, ST)

217-F. (Book.) **Bibliography on the Rolling of Iron and Steel.** Bibliographical Series No. 15a. 75 p. 1955. Iron and Steel Institute, 4 Grosvenor Gardens, London, S.W. 1, England.
Work is divided into seven sections covering theory of deformation and mechanics of rolling, rolling mill practice, defects in rolled material, reconditioning of mill equipment, manufacture of seamless tubes, effect of rolling on the properties of iron and steel, and text books. (F23, ST)

218-F. **Forging Techniques.** James A. Horn. *Aero Digest,* v. 71, Sept. 1955, p. 36-38, 40, 42.
Aircraft designer can concern himself with design efficiency, now that modern forging produces a finished pressing requiring minimum machining. Diagrams, table, photographs. (F22)

219-F. **Induction Heating of Ingot Steel.** *Canadian Metals,* v. 18, Sept. 1955, p. 32-34.
New dual-frequency, twin-tube furnace shows saving over all conventional heating methods. Photographs, diagram. (F21, J2, ST)

220-F. **Status of Beryllium Technology in the U. S. A.** A. R. Kaufmann and B. R. F. Kjellgren. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.-8/P/820, June 1955, 21 p.
Uniform rods and flats now produced have large ductility in extrusion direction but only 1 to 2% in the transverse direction; cross rolling develops greater ductility in

all directions of sheet plane but does not reduce brittleness perpendicular to plane. Preparation and properties of beryllium oxide discussed. Table. 20 ref.
(F23, F24, Q23, Be)

221-F. **How to Get Good Results in Forging High-Temperature Alloys.** A. A. Scafati. *Iron Age,* v. 176, Sept. 8, 1955, p. 67-70 .
Methods of attaining the results by using correct temperature control, proper reduction rates, methods. Photographs, table.
(F22, SG-h)

222-F. **Bearings, Lubricants, and Lubrication.** *Mechanical Engineering,* v. 77, Sept. p. 789-801.
Digest of 1954 literature reviews bearing lubrication, automotive, gear, and metalworking lubricants, lubricant theory and properties. 230 ref. (F1, G21)

223-F. **The Production of Large Forgings in Aluminum Alloys.** C. Smith and J. Crowther. *Royal Aeronautical Society, Journal,* v. 59, Sept. 1955, p. 604-612.
Needs for forgings of large size are increasing, but the consideration of alloy selection, forging stock and methods, desirable properties, heat treatment and corrosion resistance present serious problems. Photographs, table, diagrams, graphs.
(F22, Al)

224-F. **The Rolling of Metals and Alloys. VI. A Study of the Influence of Coiler and Decoiler Tension on the Magnitude of the Rolling Load.** E. C. Larke. *Sheet Metal Industries,* v. 32, no. 341, Sept. 1955, p. 699-704.
Devices for applying and controlling tension; optimum adjustments. Graphs, diagrams, tables. (To be continued.) (F23)

225-F. **Avoiding Titanium's Allergy to Air.** G. J. Wile. *Steel,* v. 137, Sept. 19, 1955, p. 112-113.
To prevent interstitial contamination by heating in air, safe time-temperature combinations for forging and hot forming were sought. Tables, nomographs, graph.
(F22, Ti)

226-F. **Boundary-Friction Lubricants [Chiefly for the Cold Working of Metals].** M. Kühn. *Henry Brutcher Translation No.* 3551, 12 p. (Condensed from *Stahl und Eisen,* v. 72, no. 20, 1952, p. 1212-1216.) Henry Brutcher, Altadena, Calif.
Previously abstracted from original. See item 321-F, 1952. (F1)

227-F. **Remote Slitting Machine.** L. N. Howell and C. C. Webster. Paper from "Fourth Annual Symposium on Hot Laboratories and Equipment". TID-5280. Office of Technical Services, U. S. Department of Commerce, p. 236-242.
Capable of cutting metal samples of various cross sectional configurations up to ¾ in. across in longitudinal direction, while submerged in organic liquid. Photographs. (F29)

228-F. (Czech.) **The Forging of Cog Wheels With Preformed Teeth.** J. David and A. Huska. *Strojirenstvi,* v. 5, no. 6, June 1955, p. 433-436.
Method economizes through minimum subsequent machining of teeth and in material savings. Procedure given for making die inserts and techniques for producing different types of cog wheels. Photographs, diagrams.
(F22, G1, G3, G17, ST)

229-F. (German.) **Cold Rolling of Phosphate Coated Steel Strips.** Werner Lueg and Karl-Heinz Treptow. *Stahl und Eisen,* v. 75, no. 17, Aug. 25, 1955, p. 1085-1092.
Development of the phosphate coating methods; effect of phosphate coats on the strength of rolled strips, on the force and work done in rolling thin strips in a 12-roll rolling mill, and of surface pressure on efficiency of the coats. Table, graphs, micrographs, diagrams. 37 ref. (F23, F1, ST)

230-F. (Hungarian.) **The Calculation of Cylinder Pressure During Pilger Rolling.** Rezso Hantos. *Kohaszati lapok,* v. 10, no. 8, Aug. 1955, p. 345-365.
Details of method, based on the Geleji formula. Diagrams, graphs.
(F23)

231-F. (Polish.) **The Role of Initial Coarse Rolling in the Development of Defective Rolled Products.** Zbigniew Sobczyk. *Wiadomosci hutnicze,* v. 11, no. 5, May 1955, p. 134-137.
Types of defective rolling mill products traceable to the first rough rolling. Effects of overheating, or underheating, twisting, and overrolling or unequal rolling. Graphs.
(F23, ST)

232-F. (Polish.) **Working the Metal From the Rear Side of the Rolling Installation.** Edward Decowski. *Wiadomosci hutnicze,* v. 11, nos. 7-8, July-Aug. 1955, p. 211-214.
Experiments in applying rolling force from both sides, (i.e., alternately from the rear and the front, in the rolling of structural H-bars), show a reduction in the number of passes and an improvement in the

quality of the rolled metal. Diagrams, tables. (F23)

233-F. (Russian.) **Calculation of the Cooling of Metal During Hot Rolling.** A. G. Stukach. *Stal',* v. 15, no. 7, July 1955, p. 626-629.

Equations for calculating temperature of the metal, in terms of the separate hot rolling passes, taking into account heat losses by zone due to radiation and other factors; comparison with direct measurement. Graphs. 8 ref. (F23)

234-F. Two Decades of Progress in the Forging Industry. H. J. Merchant. *Australasian Engineer,* 1955, July, p. 56-68.

Economic and competitive position of the industry, equipment, new materials, technique and improved working conditions. Photographs, diagrams. 27 ref. (F22, A4)

235-F. Estimation of Temper-Rolling Reductions of Mild-Steel Sheet by an X-Ray Diffraction Method. P. W. Wright and B. B. Hundy. *Iron and Steel Institute, Journal,* v. 181, Sept. 1955, p. 40-43 + 4 plates.

By comparing pattern from unknown sample with those from standard samples, it is possible to estimate temper-rolling reduction of unknown. Diagram, photographs, micrographs. 5 ref. (F23, M22, CN)

236-F. The Design of Closed-Die Forgings. *Metal Progress,* v. 68, Aug. 15, 1955, p. 65-75.

Details of hammer forgings. General forging considerations such as tolerances, costs, steel selection and design. Diagrams, graphs, tables. (F22)

237-F. The Forging and Heat Treating of Tool Steel. *Metal Progress,* v. 68, Aug. 15, 1955, p. 151-157.

Step-by-step procedure for recommended processing of toolsteels. Tables, photographs. (F22, J general, TS)

238-F. The Precision Forge—Roll Process. A. E. Felt. *Steel Processing,* v. 41, Sept. 1955, p. 571-574, 602.

Combination of forging and rolling used to produce steel components for hollow propeller blades. Photographs, diagrams. (F22, F23, ST)

239-F. Impacter Applied in New Production Process. T. A. Dickinson. *Steel Processing,* v. 41, Sept. 1955, p. 575, 603.

Currently being used in manufacture of aluminum rocket fin blades for U. S. Navy, this cold forging could serve many other applications where use of raw materials of high ductility is practical. Photograph. (F22, Al)

240-F. Flame-Straightening: A Friend in Need. I. Joseph Holt. *Welding Engineer,* v. 40, Oct. 1955, p. 44-46.

Oxy-acetylene torch can be used to salvage bent steel members or to bend members for fabrication. Photographs, diagrams. (To be continued.) (F29, G6, ST)

241-F. (French.) **Structure and Properties of Restored Metal.** Aurel Berghezan. *Métaux corrosion-industries,* v. 30, nos. 359-360, July-Aug. 1955, p. 269-293 + 4 plates.

Phenomena observed during cold working and annealing of an aluminum-magnesium alloy with 3.05% magnesium. Color micrographic and X-ray study. Micrographs, graphs, charts, drawings, table. 29 ref. (F23, J23, Al)

242-F. (German.) **Investigation of Belt Drop-Hammer With Divided Hammer Tup.** Paul Grüner and Edmund Kraft. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 507-518.

Investigation of falling tups and factors of drop height, distance between the tups, hammer weight, anvil movement, forging losses and stand vibration. Graphs, photographs, diagrams, oscillogram. 14 ref. (F22)

243-F. (German.) **Contribution to Light Metal Semi-Finished Surface Conditions Before the Anodic Oxidation Process.** H. A. J. Stelljes. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 748-751.

Methods of improvement of semi-finished decorative metal surfaces before anodizing by pressing, rolling, grain improvement and annealing of aluminum. Micrographs, graph, 7 ref. (F23, J23, Al)

244-F. (German.) **Shaping of Polycrystalline Magnesium.** F. Erdmann-Jesnitzer and H. Kahle. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 776-779.

Workability and peculiarities of magnesium, data on optimal conditions and upsetting factor. Diagram, graphs, tables, micrographs. 6 ref. (F22, Q23, Mg)

245-F. (German.) **Forging.** Eberhard Pflaume. *Metallurgie,* v. 5, no. 8, Aug. 1955, p. 245-250.

When to use hammer or press. Photographs. 56 ref. (F22)

246-F. (German.) **Machines for Processing Medium and Heavy Plates.** Friedrich Wilhelm Zürcher. *Stahl und Eisen,* v. 75, no. 18, Sept. 8, 1955, p. 1182-1188.

Shears, straightening machines, bending machines and presses under working conditions at plate producer and consumer plants. Photographs. 6 ref. (F29, G1, ST)

247-F. (Pamphlet.) **Extrusion of Titanium. Technical Report Under Contract no. AF 33(038)-3736.** Alvin M. Sabroff, W. Maxwell Parris, and Paul D. Frost. PB 111696. 77 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

Unalloyed titanium and the Ti-3Mn-complex alloy were used to study effects of extrusion temperature and die design and to evaluate various lubricants and die materials. Lubricants containing graphite, molybdenum disulfide, and mica produced acceptable surface finishes; however, the best results were obtained with these materials suspended in a Bentone grease. The titanium and chromium carbides, and cobalt-base alloys were the most promising die materials. Photographs, graphs, tables, diagram. (F24, Ti, Co)

248-F. Establishing Soaking Pit Schedules From Mill Loads. R. D. Hindson and J. Sibakin. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Oct. 1955, p. 1105-1112.

Heating temperatures, soaking times, pit capacity and safe mill drafts correlated with fluctuations in current or load of bloom mill driving motor. Graphs, tables. (F21, ST)

249-F. Maintenance of Quality in Aluminum Sheet Rolling Oils. J. O. McLean. *Lubrication Engineering,* v. 11, Sept.-Oct. 1955, p. 337-339.

Elaborate adsorptive clay by-pass filter system keeps oil fairly clean but has some disadvantages. Diagram, photographs, micrograph. (F1, F23, Al)

250-F. Promotion of Fluid Lubrication in Wire-Drawing. II. D. G. Christopherson. *Wire Industry,* v. 22, Sept. 1955, p. 885-887.

Comparison of fluid and soap lubricants, drawing force tests, effect of lubricant flow, comparison of wear with soap and oil. Tables. 8 ref. (F1, F28)

251-F. How to Extrude Alcan 50S Aluminum Alloy. B. W. Bischof and J. F. Whiting. *Modern Metals,* v. 11, Oct. 1955, p. 34-36, 38-39.

Success depends on mechanics of metal flow. Extrusion defects, causes and cures, heat treatments and properties of Alcan 50S. Micrographs, photographs, tables, graphs. (F24, Al)

252-F. The Rolling of Metals and Alloys. VI. A Study of the Influence of Coiler and Decoiler Tension on the Magnitude of the Rolling Load. E. C. Larke. *Sheet Metal Industries,* v. 32, no. 342, Oct. 1955, p. 781-785.

Includes tables, graphs. 4 ref. (To be continued.) (F23)

253-F. Development of a Die Block for Closed Die Forging. John A. Succop. *Steel Processing,* v. 41, Oct. 1955, p. 621-635.

History of drop forge die block, manufacture of Hardtem die blocks, development of dies for mechanical press and large hydraulic presses. Photographs, graphs, micrographs. (F22)

254-F. Study of Die Wear by Means of Radio-Activated Surfaces. B. J. Jaoul. *Steel Processing,* v. 41, Oct. 1955, p. 636-641.

Surface radio-activation permits precise determination of location of wear in which the autoradiographic method maps the relief of the die and is then calibrated against Geiger-Muller tube measurements. Graphs, diagrams, radiographs. (F24, S19)

255-F. (French.) **Production of Large Diameter Aluminum Wire by the Continuous Machine.** Ugo Lecis and B. Panebianco. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 151-155; disc., p. 155.

Adaptation of Properzi "continuous" machine to casting of large diameter aluminum wire. Photographs, micrographs, graphs. (F28, Al)

256-F. Tube-Forming Techniques Simplify Structural Assemblies. F. J. Pesak. *Iron Age,* v. 176, Oct. 27, 1955, p. 78-80.

Airframe manufacturers spin, swage, impact extrude and gather to eliminate inefficient joining methods. Photographs. (F26)

257-F. Titanium Extrusion—A New Fabricating Technique. I-II. A. M. Sabroff, W. M. Parris and P. D. Frost. *Iron Age,* v. 176, Oct. 27, 1955, p. 81-84; Nov. 3, 1955, p. 101-103.

Successful extrusion depends on extrusion temperature, die design, material and lubrication. Carbide dies and proper lubricant gave best results and proved most efficient. Graphs, micrographs, photographs, diagram. (F24, F1, Ti)

258-F. Factors Affecting the Characteristics of $Ca(OH)_2$ in Suspension,

With Special Reference to the Wire Drawing Industry. Thomas C. Miller. *Wire and Wire Products*, v. 30, Oct. 1955, p. 1212 + 6 pages.

Crystalline calcium hydroxide can be produced on heated bodies submerged in suspensions of it. Photographs, tables, micrographs. (F28)

259-F. Wax Lubricants in Non-Ferrous Wire Drawing. John Werner. *Wire and Wire Products*, v. 30, Oct. 1955, p. 1223-1225.

Different lubricants for copper and aluminum wire which will facilitate passage of wire through die and will disperse the heat generated by friction and deformation of metal. (F1, F28, Cu, Al)

260-F. Drawing and Processing of Titanium Wire. Douglas H. Wilson. *Wire and Wire Products*, v. 30, Oct. 1955, p. 1246-1247, 1305.

Investigation of lubricants, coatings, dies, center condition and developments at Crucible-Syracuse. (F28, Ti)

261-F. (German.) **Rolling Properties of Transformer Steels With More Than 3.3% Silicon Content.** Franz Lihl and Paul Zemsch. *Archiv für das Eisenhüttenwesen*, v. 26, no. 10, Oct. 1955, p. 599-602.

Ductility limits of steel with 4.3% silicon and 0.25% aluminum; experiments with preheated alloys; conditions for rolling high-silicon transformer steels; influence of peg count on rolling. Graphs, table, photographs. 6 ref. (F23, Q23, AY)

262-F. (German.) **Light Metal Forging With the Horizontal Forging Machine.** B. Preuss. *Metall*, v. 9, nos. 19-20, Oct. 1955, p. 883-885.

Advantages and characteristics, methods of dimensional calculation, with emphasis on magnesium alloys. Diagrams, tables. (F22, EG-a)

SECTION G

SECONDARY MECHANICAL WORKING

1-G. Ultrasonic Machining of Tungsten Carbide. Dieter Goetze. *Institute of Radio Engineers, Transactions of the I.R.E. Professional Group on Ultrasonics Engineering,* PGUE-2, Nov. 1954, p. 19-22.

Factors affecting operation and results. Graphs. (G17, C-n)

2-G. Dodge Finishes Pistons by Turning. B. W. Bogan. *Machinery,* v. 61, Nov. 1954, p. 170-177.

Need for cam grinding operations is eliminated and quality is improved. Photographs, diagrams. (G17, Al)

3-G. An Ultrasonic Machine Tool. Neil Clark, Jr. *Institute of Radio Engineers, Transatcions of the I.R.E. Professional Group on Ultrasonics Engineering,* PGUE-2, Nov. 1954, p. 10-18.

Theory, design, operation, action and application. Photographs, diagrams, circuits. (G17)

4-G. Cutting Forces: Their Effects on Milling Operations and Milling Cutter Selection. Horace A. Frommelt. *Machine and Tool Blue Book,* v. 49, Nov. 1954, p. 186 + 11 pages.

Relationships between the force and rate at which it is applied in slab, face and straddle, step and duplex and conventional and climb mills. Diagrams. (G17)

5-G. (French.) **Theory Relative to the Influence of Elements and Hexagonal Compounds in Polycrystalline Groups.** A. Paudrat. *Métaux, Corrosion-Industries,* v. 29, no. 349, Sept. 1954, p. 315-334.

Theoretical study of phenomena of dry lubrication, wear resistance and cutting rate during machining of steel. Diagrams, graphs, table. (To be continued.) (G17, Q9, ST)

6-G. Russian Report. Ceramic-Tipped Tools Will Cut Steel. *American Machinist,* v. 98, Nov. 22, 1954, p. 113-115.

Review and evaluation of data in Russian literature. Diagrams, tables. 8 ref. (G17, ST)

7-G. Electronic Servo Positioning. Walton Rainey. *Automation,* v. 1, Nov. 1954, p. 61-64.

Automatic positioning of workpiece in machine tools. Diagrams, photographs. (G17)

8-G. The Grinding of Steel. XXI. Finishing by Abrasive Belt. *Edgar Allen News,* v. 33, Nov. 1954, p. 256-257.

Belt grinding machines, abrasives, operating procedures. (To be continued.) (G18)

9-G. Symposium on Metal-Working Oils. I. Metal Cutting. *Institute of Petroleum, Journal,* v. 40, Sept. 1954, p. 243-276; disc., p. 276-290.

Includes "Mechanism of Friction and Lubrication in Metal-Working", F. P. Bowden and D. Tabor; "A Preliminary Investigation of the Effectiveness of Various Chlorinated Hydrocarbon Compounds as Cutting Oil Additives", K. J. B. Wolfe, M. D. Kinman, and G. Lennard; "Some Aspects of the Metal Cutting Process", Geo. V. Stabler; "Mechanical Testing of Cutting Oils", I. S. Morton and R. Tourret "Satisfactory Records Are Essential to the Economic Application of Cutting Fluids", H. Grisbrook; and "The Evaluation of Cutting Fluids With Special Reference to Practice in the U.S.A.", A. J. Chisholm. (G21)

10-G. Force, Temperature Measurements Rapid Guide to Tool Life Evaluation. E. A. Loria and D. R. Walker. *Iron Age,* v. 174, Nov. 18, 1954, p. 156-158.

Results are more useful and reliable than wear test data. Tables, graphs, photograph. (G17, Q9, CI)

11-G. The Mechanics of Machining: A New Approach. R. Hill. *Journal of*

the Mechanics and Physics of Solids, v. 3, Oct. 1954, p. 47-53.

Method uses a theorem on maximum intensity of singularities in a material that yields when the shear stress attains a critical value. Diagram, tables, graphs. 7 ref. (G17)

12-G. **Designing for Production—Retaining. II.** W. M. Halliday. *Product Engineering,* v. 25, Nov. 1954, p. 182-183.

Five basic ideas for clamping, holding and clinching parts during machining. Diagrams. (G17)

13-G. **Design Possibilities for Automatic Spinning.** F. L. Banta. *Product Engineering,* v. 25, Nov. 1954, p. 188-192.

Advantages, limitations and other criteria for determining applicability, comparison of piece costs with stamping operation. Photographs, diagrams, table, graph.
(G13, SS, Ti, SG)

14-G. **Troubles With Cold Extrusion May Be Traced to Lubrication.** J. F. Leland and J. W. Helms. *SAE Journal,* v. 62, Nov. 1954, p. 43-45.

A step-by-step procedure for one recommended coating and lubricating cycle. Photograph. (G5, ST)

15-G. **Problems Encountered in the Design of Press Tools.** J. A. Grainger. *Sheet Metal Industries,* v. 31, no. 331, Nov. 1954, p. 897-905, 928.

Principles for blanking, piercing and drawing dies. Diagrams, photographs. (To be continued.)
(G2, G4, TS)

16-G. **Recent B.I.S.R.A. Work on the Elimination of Stretcher Strains in Mild-Steel Pressings.** B. B. Hundy. *Sheet Metal Industries,* v. 31, no. 331, Nov. 1954, p. 909-920.

Factors influencing temper rolling and levelling processes. Photographs, graphs, diagrams. 28 ref. (G4, CN)

17-G. (French.) **Hot Machining.** H. Laplanche. *Métallurgie et la construction mécanique,* v. 86, no. 9, Sept. 1954 p. 659, 661-662.

Principles and use for very hard alloys. Test results. Graphs, tables. (G17, SS)

18-G. (Russian.) **Investigation of Temperature in the Case of Super-High Cutting Rates.** E. D. Salomonovich. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 45-46.

Experimentally determines average temperatures at point of contact between cutter made of hard alloy and material being machined. Diagrams. 4 ref. (G17)

19-G. (Russina.) **Determination of Stability Relationships During High-Speed Cutting According to the Hardness of Hard Alloys and Steels in the Hot State.** A. I. Betaneli. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 62-64.

Method for determining stability according to the difference in the hardness of the cutting and cut materials. Nomogram. 4 ref. (G17)

20-G. **A Theoretical Investigation of the Temperature Distribution in the Metal Cutting Process.** A. C. Rapier. *British Journal of Applied Physics,* v. 5, Nov. 1954, p. 400-405.

Relaxation and analytical methods of solution developed and applied to the work material, the chip and the tool. Diagrams, graphs. 8 ref. (G17)

21-G. **How Ryan Forms and Welds Titanium.** *American Machinist,* v. 98, Dec. 6, 1954, p. 138-141.

Methods for hot or cold forming and resistance or fusion welding. Photographs.
(G general, K3, K1, Ti)

22-G. **Some Lubrication Effects in Deep Drawing Operations.** E. M. Loxley and P. Freeman. *Institute of Petroleum, Journal,* v. 40, Oct. 1954, p. 299-307.

The anomalous drawing properties of aluminum sheet; stretch-forming and cylindrical drawing of steel sheet; ironing of thin-walled metal cups. Tables, graphs, diagrams. 10 ref. (G4, G21, Al, ST)

23-G. **Shot Peening Saves Weight, Improves Fatigue Life on Low Volume Parts.** W. G. Patton. *Iron Age,* v. 174, Dec. 9, 1954, p. 152-153.

Techniques for and results of treating various parts. Photographs. (G23, Q7)

24-G. **Metal Machining.** W. Alfred Carter. *Machinery Lloyd (Overseas Ed.),* v. 26, Nov. 20, 1954, p. 70-84.

Factors affecting machining operations; application of photography to cutting tools; chip forming and flow; basic types of chip. Photographs, diagrams. (G17)

25-G. **Cutting Force: Its Effect on Machine Design, Workpiece, Positioning, Maintenance.** Horace A. Frommelt. *Machine and Tool Blue Book,* v. 49, Dec. 1954, p. 198-200 + 11 pages.

With workpieces designed to reduce cutting forces, processing costs will be reduced and better finishes will result. Photographs, diagrams. (G17)

26-G. **Grinding Cemented Carbides.** Arthur H. Allen. *Metal Progress,* v. 66, Dec. 1954, p. 115-119.

New grinding processes—electro-discharge, electrolytic, ultrasonic, and silicon carbide belt and wheel grinding—circumvent the need for diamond wheels in tool dressing. Improvements in diamond grinding and efficient salvage of waste materials also help conserve the dwindling supply of bort. Photograph, tables. (G18, C-n)

27-G. **Specific Machinability Ratings for New Copper-Zinc Alloys.** *Screw Machine Engineering,* v. 16, Dec. 1954, p. 50-51.

Ratings and approximate values to be used as a guide for correct tool shapes, speeds and feeds. Advantages of new alloys. Tables. (G17, Cu, Zn)

28-G. (Czech.) **Forming and Annealing of Molybdenum.** Jiri Vacek. *Hutnické Listy,* v. 9, no. 7, July 1954, p. 417-421.

Powder metallurgy and melting methods for producing plates and sheets; mechanical and physical properties. Graphs, tables. 11 ref. (G general, J23, H10, Mo)

29-G. (French.) **Contribution to the Study of Oxygen Cutting.** Jean-Marie Morelle. *Revue de la soudure (Brussels),* v. 10, no. 3, 1954, p. 164-185.

Flow of slag in the cut; interrupted cutting; surface streaks; composition of slags; influence of temperature and pressure; conclusions. Tables, diagrams, graphs, micrographs. 21 ref. (G22, ST)

30-G. (German.) **Deep Drawing Test for Thin Strip.** Alfred Krisch. *Stahl und Eisen,* v. 74, no. 24, Nov. 18, 1954, p. 1591-1594.

Test for brass and steel from 0.10 to 0.40 mm. thick by 70 mm. wide. Effects of hold-down pressure. Formation of wrinkles. Tables, graphs, photographs. 4 ref. (G4, Cu, ST)

31-G. **The Forming of Aluminium Sheet. IX. Blanking and Piercing.** H. Hinxman. *Sheet Metal Industries,* v. 31, no. 332, Dec. 1954, p. 995-999.

Precautions for various sizes and conditions of the material. Photographs, tables, diagrams. (To be concluded.) (G2, Al)

32-G. (Russian.) **Problem of the Machinability of Stainless Steels.** I. P. Efremov and I. G. Shneider. *Stanki i Instrument,* v. 25, no. 8, Aug. 1954, p. 13-15.

Evaluation for various machining and cutting operations for 13% chromium and 18-8 types. Table. (G17, SS)

33-G. **Cope Talks on Draw Dies. XXII. Make Small Shells in Progressive Dies.** Stanley R. Cope. *American Machinist,* v. 98, Dec. 20, 1954, p. 94-97.

Seven methods of drawing shells. Diagrams. (G4)

34-G. **Cold Forming Methods Save Materials, Lower Processing Costs.** K. W. Stalker. *Iron Age,* v. 174, Dec. 23, 1954, p. 69-70.

Rolling against a mandrel produces accurately shaped parts with low scrap losses. Diagram. (G11)

35-G. **Flame Cutting With Electronic and Magnetic Tracers.** R. F. Helmkamp. *Steel Processing,* v. 40, Dec. 1954, p. 786-792.

Equipment and processes for guiding cutting torches. Photographs, diagrams. (G22)

36-G. **A Modern Perspective of the Grinding Process.** H. R. Letner. *Steel Processing,* v. 40, Dec. 1954, p. 774-779, 798.

Theories, behavior of abrasives, chips and work piece, effects of abusive grinding. Diagrams, photographs, micrographs, graphs. 23 ref. (G18)

37-G. **Slotting Operations.** John E. Hyler. *Western Machinery and Steel World,* v. 45, Dec. 1954, p. 72-74.

New developments and methods lower production costs. Photographs. (G17)

38-G. **Mechanics of Tool Engineering. XVI. Techniques of Sheet Metal Fabrication.** Andrew E. Rylander. *Western Machinery and Steel World,* v. 45, Dec. 1954, p. 75-80.

Principles and various tools for sheet metal work. Photographs. (G general)

39-G. **Jets: From Blueprint to Engines.** W. E. Jones and A. J. Rosenberg. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 219-243.

Fabrication of carbon, low-alloy and stainless steels and superalloys. Graphs, photographs, micrographs. 2 ref. (G general, T25, ST, SG-h)

40-G. (Book—German.) **Machine Tools for the Machining of Metals. (Werkzeugmaschinen für Metallbearbeitung.)** Karl P. Matthes. 100 p. 1954. Walter De Gruyter & Co., Genthiner Str. 13, Berlin W35, Germany.

Discusses the need for machine tools, life span of the machine, and the effect of the state of technical development. Treats the general basis of the machine tools, their historical development, properties, types and standards and limits of precision. (G17)

41-G. Plastic Working of Metals. W. S. Wagner. *American Society of Mechanical Engineers, Paper no.* 54-A-64, 1954, 9 p. + 2 plates.

Review of the art; effects of temperature, work hardening, deformation strength and aging; relationships of stress-strain data and plastic working. Tables, graphs. 5 ref. (G general, Q23)

42-G. Surface Damage in Grinding of Steel. Robert L. Kamm. *Australasian Engineer,* 1954, Nov., p. 62-70.

Types of injuries with reference to the fundamental mechanics of the grinding process and aspects of heat treatment and metallography involved. Corrective measures by control of metallurgical and grinding variables and of lubrication. Graphs, micrographs, tables, diagrams. 32 ref.
(G18, CN, CI, AY, TS)

43-G. Titanium Tips. Dave Adams. *Aviation Age,* v. 23, Jan. 1955, p. 66-73.

Comprehensive study to determine best methods for fabricating titanium by analyzing all processes involved in sheet metal fabrication. Photographs. (G general, Ti)

44-G. Why Stainless Is Hard to Cold Head. W. M. Baldwin, Jr., and C. A. Beiser. *Iron Age,* v. 175, Jan. 13, 1955, p. 82-85.

Effects of deformation rates on embrittlement of 12 iron-nickel-chromium alloys. Photographs, graphs, diagrams.
(G10, Q23, SS)

45-G. Spinforming Stainless Steel. A. Roland Teiner. *Machine Design,* v. 27, Jan. 1955, p. 148-153.

Basic design and production considerations for spun parts. Photographs, diagrams. (G13, SS)

46-G. Machining Forged Titanium 150A. *Machinery (London),* v. 85, Dec. 17, 1954, p. 1304-1311.

Measurements of drilling and cutting forces. Effects on tool life of shape, cutting speeds, feed rates, cutting lubricants and coolants. Tables, photographs, graphs, diagrams. (G17, Ti, CN, Ni)

47-G. How to Machine Titanium. H. Jack Siekmann. *Tool Engineer,* v. 34, Jan. 1955, p. 78-82.

Suggested recommendations by understanding its behavior and by selection of carbide grades. Graphs, tables, photographs. (G17, Ti, C)

48-G. Avoiding Tool Failures With Negative Rake. Max Kronenberg. *Tool Engineer,* v. 34, Jan. 1955, p. 83-87.

Mathematical analysis of the actions of forces on cutting tools serves as an understanding to new application of coolants. Diagrams, graph, table. 3 ref. (G17, G21, C)

49-G. Select the Right Grinding Wheel. *Welding Engineer,* v. 40, Jan. 1955, p. 44-48.

Practical tips in proper wheel selection, based on the nature of abrasive, grain size, grade, hardness, structure and bond. Tables, photographs. (G18, Al, Cu, CI, Cn, TS, SS)

50-G. (French.) **Contribution to the Study of the Influence of the Preparation of Steel on the Suitability of Thin Sheets for Stamping.** G. Husson, J. Stremsdoerfer, L. Beaujard and J. Tordeux. *Institut de Recherches de la Sidérurgie, Publications,* ser. A, no. 81, Oct. 1954, 143 p.

Influence of ingot practice, rolling and heat treatment variations on forming characteristics and mechanical properties of steel sheet. Micrographs, tables, graphs, photographs, diagrams.
(G3, J general, Q general, CN)

51-G. (German.) **Hydromatic Drawing Process.** M. Nickels. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 35, Dec. 11, 1954, p. 1165-1167.

Details and advantages of the Kranenberg drawing process, based on embedding the blank directly into the pressure liquid. Diagrams, photographs. (G4, Al)

52-G. (Russian.) **New Method for Determining the Components of a Cutting Force in Turning.** P. G. Terlikov. *Vestnik Mashinostroeniia,* v. 34, no. 11, Nov. 1954, p. 42-48.

Variables to be considered and measuring techniques. Tables, diagrams, photograph, graphs. 3 ref. (G17)

53-G. Cope Talks on Draw Dies. XXIII. Progressive Dies Can Make Deep Shells. Stanley R. Cope. *American Machinist,* v. 99, Jan. 17, 1955, p. 112-115.

Holding partially formed parts; use of pressure pads; location of punches; use of downward and upward drawing. Diagrams. (To be continued.) (G4)

54-G. The Development of the Basic Converter Process in Europe. A. Desoer, F. Vanderstrick and J. Wurth. *Blast Furnace and Steel Plant,* v. 43, Jan. 1955, p. 45-53.

Experimental data on suitability of oxygen blown steel for deep drawing applications. Graphs, tables, photographs. 17 ref. (G4, D3, CN)

55-G. Studies in Cold-Drawing. I. Effect of Cold-Drawing on Steel. II.

Cold-Working 2S-O Aluminum. H. Majors, Jr. *ASME, Transactions,* v. 77, Jan. 1955, p. 37-56; disc., p. 47-48.
Hardness, torsion and tension properties; residual stresses; microstructure; fatigue data. Tables, graphs, micrographs, diagrams, photographs. 25 ref.
(G4, Q general, CN, Al)

56-G. **Measurement of Effectiveness of Cutting Oils.** F. Eugene. *Scientific Lubrication,* v. 7, Jan. 1955, p. 24-29.
Influence of lubricant on cutting temperature, tool wear and specific work of cutting. Diagrams, tables, micrographs, graph. (G21)

57-G. **How To Simplify Stainless Steel Grinding.** John Clark, Jr. *Tooling and Production,* v. 20, Jan. 1955, p. 79, 82, 87.
Methods devised by Norton Company. Photographs, tables.
(G18, SS)

58-G. (Book.) **Living Crafts.** G. Bernard Hughes. 192 p. 1954. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. $4.75.
Review of ancient crafts that are currently practiced because no better methods have been found. Covers beating of gold leaf, silversmithing, working of pewter, and various processes for nonmetallic materials.
(G general)

59-G. **Machining Titanium. An Investigation Into the Machining of Ti-150A Alloy in the Forged State. I. Drilling and Turning Tests. Tool-Life.** J. T. D. Holt and J. Purcell. *Aircraft Production,* v. 17, Feb. 1955, p. 60-64.
Drilling and cutting forces; effects of tool shape, cutting speeds and lubricants on tool life. Photograph, tables, graphs, diagram.
(G17, Ti)

60-G. **On the Drilling of Metals. I. Basic Mechanics of the Process.** C. J. Oxford, Jr. *ASME, Transactions,* v. 77, Feb. 1955, p. 103-111; disc., p. 111-114.
Effects of drill design, material properties and cutting conditions on complex phenomena of twist drill cutting action. Diagrams, photographs, micrographs, graphs. 16 ref. (G17)

61-G. **The Shear Stress in Metal Cutting.** M. C. Shaw and Iain Finnie. *ASME, Transactions,* v. 77, Feb. 1955, p. 115-123; disc., p. 123-125.
Discrepancies between torsion tests and cutting stress-strain data. Specimen size effect in cutting seems to be the most important factor. Diagrams, graphs, micrograph. 32 ref. (G17, Q1)

62-G. **Economic Aspects of Grinding Sintered Carbide Tools With Diamond Grinding Wheels.** J. Witthoff. *Engineers' Digest,* v. 16, Jan. 1955, p. 22-26. (From *Technische Mitteilungen Krupp,* v. 5, no. 12, Sept. 1954.)
Use of diamond wheels resulted in decreased costs, chiefly due to increased tool life. Tables, graphs, photograph. (G18, C-n)

63-G. **Machining the Copper Alloys.** *Steel,* v. 136, Feb. 7, 1955, p. 108-110.
Speeds, feeds and lubricants for turning, milling, drilling and reaming. Tables. (G17, Cu)

64-G. **Economical Speeds and Feeds for Production Turning.** *Tool Engineer,* v. 34, Feb. 1955, p. 119-124.
Data based on dynamometer tests with tools made of various alloys. Tables. (G17)

65-G. **Machining With Ultrasound.** Thomas A. Dickinson. *Western Machinery and Steel World,* v. 46, Jan. 1955, p. 72-74.
Quick and efficient shaping of hard and brittle materials with the Cavitron. Photographs. (G17, C-n)

66-G. **Use of Cutting Fluid in High-Speed Counterboring of Gray Iron.** T. F. Terlikova. *Henry Brutcher Translation no.* 3158, 6 p. Henry Brutcher, Altadena, Calif. (From *Vestnik Mashinostroeniia,* v. 33, no. 5, 1953, p. 59-61.)
Effects of counterboring and tool geometry upon machine precision and surface finish; nature of wear of carbide-tipped counterbore. Graphs. (G21, G17, CI)

67-G. (Russian.) **A New Technological Method of Production of Cermet "Electrode-Tools" for Electric-Spark Machining of Metals.** E. A. Volodin and L. A. Kovsharova. *Vestnik Mashinostroeniia,* v. 34, no. 12, Dec. 1954, p. 56-57.
Method, installation, conditions of operation and material used. Photograph, diagrams.
(G17, H general, Cu)

68-G. **Hot Formed Magnesium Skins Save Weight and Time.** R. H. Owen. *Aero Digest,* v. 70, Feb. 1955, p. 52, 54, 56.
Techniques for hydraulic, drop hammer, punch press and brake forming of aircraft control surfaces. Photographs. (G1, Mg)

69-G. **High Power Spark Erosion Machine.** L. R. Blake. *Engineer,* v. 199, Feb. 18, 1955, p. 222-226.
Circuits and operating characteristics. Diagrams, photographs, graphs. 3 ref. (G17)

70-G. Adaptability of Metals to Spinning. *Materials & Methods,* v. 41, Feb. 1955, p. 131.
Data sheet. (G13)

71-G. New Method for Machining Sintered Tungsten. Roberto Levi. *Precision Metal Molding,* v. 13, Mar. 1955, p. 58-60.
Technique consists of infiltrating fully sintered porous ingot with a metal followed by machining and then removing the infiltrant by volatilization. Photographs, micrograph, table. 3 ref. (G17, H16, W)

72-G. Factors Affecting the Use of Hydraulic and Crank Presses for Cold-Working Operations. A. R. E. Singer. *Sheet Metal Industries,* v. 32, no. 334, Feb. 1955, p. 85-91, 144.
Economic, technical and metallurgical considerations in selecting metalworking machines. Graphs, table. 9 ref. (G1)

73-G. Electrolytic Grinding—Its Status and Future. George Comstock. *Steel Processing,* v. 41, Feb. 1955, p. 97-99.
Equipment and methods. Future prospects. Photographs, diagram, table. (G18)

74-G. Problems in Press Tool Design. I. Blanking, Piercing and Allied Operations. J A. Grainger. *Steel Processing,* v. 41, Feb. 1955, p. 104-112, 124.
Design factors for progressive dies. Diagrams, photographs. (G1)

75-G. Developments in the Flame-Cutting of Ship Plate. Richard R. Sillifant. *Welding and Metal Fabrication,* v. 23, Feb. 1955, p. 40-47.
Improvements in machine designs and cutting techniques. Photographs, diagrams, tables. (To be continued.) (G22, CN)

76-G. (Italian.) **Inconveniences Encountered in the Mechanical Working of Stainless Steels.** *Industria Meccanica,* v. 6, no. 12, Dec. 1954, p. 662-665.
Problems encountered in turning, shaping, drilling, extruding, milling, broaching and boring of stainless steel. (G17, G5, SS)

77-G. (Russian.) **Present State and Future of Industrial Application of Electrical Methods of Machining Metals.** V. I. Rassokhin and A. L. Livshits. *Stanki i Instrument,* v. 26, no. 1, Jan. 1955, p. 8-12.
Theory; technological characteristics of experimental machine tools; advantages and disadvantages. Diagrams, photographs. (G17)

78-G. (Russian.) **Rapid Heating of Blanks for Stamping.** A. D. Assonov. *Vestnik Mashinostroeniia,* v. 35, no. 1, Jan. 1955, p. 76-77.
Temperature and time of heating; physical properties of the metal; gas heating and control problems; induction heating. Diagram. (G3, J general, ST)

79-G. Flame-Straightening Bent Beams. Herman C. Phelps. *Welding Engineer,* v. 40, Mar. 1955, p. 24-25.
Procedures for localizing heated areas and application of force to restricted portions of the work. Photographs. (G22)

80-G. (Pamphlet.) **A Study of the Tangential and Normal Cutting Forces Produced When Machining Titanium.** L. V.Colwell and R. M. Caddell. PB 111479, July 1953, 7 p. + 24 plates. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.
Factors influencing behavior of cutting forces; criteria determining most efficient machining practice for a given product or operation. Tables, graphs. (G17, Ti)

81-G. (Pamphlet.) **Turning Titanium With Sintered Carbide Tools.** L. V. Colwell. PB111480, June 1953, 5 p. + 24 plates. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.
Combinations of carbide material and tool shape most satisfactory under representative commercial conditions. Graphs. (G17, Ti)

82-G. Cope Talks on Draw Dies. XXV. How to Make Shells With Ribs, Bosses and Projections. Stanley R. Cope. *American Machinist,* v. 99, Mar. 14, 1955, p. 145-148.
Ways to cause metal to flow properly in a series of operations. Diagrams. (To be continued.) (G4)

83-G. Machining and Machinability. Francis W. Boulger. *Canadian Metals,* v. 18, Mar. 1955, p. 40-41.
Machinability depends on inherent properties of the material and on machining operation. Most important properties affecting machinability are frictional behavior and strength of the metal in the actual cutting direction. Graphs, diagram, photograph. (To e continued). (G17)

84-G. Electronic Tracer Control of Machine Tools. J. A. Stokes. *Engineer,* v. 199, Feb. 25, 1955, p. 268-270.
Several forms of tracer control equipment applicable to a wide range of machine tools. Photographs, diagrams. (G17)

85-G. Drawing and Forming Chromium-Nickel Stainless Steels. W. E.

McFee. *Finish,* v. 12, Apr. 1955, p. 27-30.
Die practice and lubricants. Photographs, table. (G4, SS)

86-G. Metal Machining. II. Cutting Forces and Cutting Conditions. W. Alfred Carter. *Machinery Lloyd (Overseas Ed.)* v. 27, Feb. 26, 1955, p. 69, 71-74.
Stresses in tools; action of cutting fluids. Diagrams, photograph. (G17, G21)

87-G. The Use of Ethoxyline Resins in Modern Tool Manufacture. K. Meyerhans. *Sheet Metal Industries,* v. 32, no. 335, Mar. 1955, p. 165-172; disc., p. 172-175.
Properties of resins, uses in manufacture of blanking, piercing and forming dies. Tables, diagrams. (G2)

88-G. (Italian.) **Grinding and Buffing of Semiworked Metal Before Fabrication and Finishing of the Piece.** *Industria Meccanica,* v. 7, no. 1, Jan. 1955, p. 29-32.
Suggested techniques as aids for above operations. Table. (G18, L10)

89-G. (Polish.) **Causes of Lamination of Brass Used in Deep Drawing.** S. Balicki and L. Gablankowski. *Prace Instytutow Ministerstwa Hutnictwa,* 1954, no. 6, p. 315-320.
The residual beta-phase and the hydrogen entering at time of melting and pouring are responsible for the defects, and both are eliminated by heating at 800° C. before plastic working. Micrographs, tables, graph, diagram, photographs. 8 ref. (G4, Cu)

90-G. Short Run Press-Formed Parts. Malcolm W. Riley. *Materials & Methods,* v. 41, Mar. 1955, p. 121-136.
Forming methods; advantages and limitations; design considerations. Photograph, diagrams, tables. (G1)

91-G. Metal Machining. II. Cutting Forces and Cutting Conditions. III. Angles of Cutting Tools. W. Alfred Carter. *Machinery Lloyd (Overseas Ed.),* v. 27, Mar. 19, 1955, p. 37, 39, 41-43; Mar. 26, 1955 p. 69, 71-73.
Effect of chip heat and cutting fluid on tool life. Diagrams, photographs. (G17)

92-G. A Study of Electro-Erosion Processes. Sparks and Arcs. H. Axer. *Machinist (London),* v. 99, Mar. 25, 1955, p. 529-534.
Differences of principle and result of electro-erosion methods. Circuit diagrams, oscillograms, photographs, tables. (G17)

93-G. Electric Spark Machining. Everard M. Williams and C. Paul Porterfield. *Consulting Engineer,* v. 5, Apr. 1955, p. 34-37.
A promising metalworking technique. Photographs, micrographs, diagram. (G17)

94-G. The Production of Perforated Metal Sheet. *Machinery (London),* v. 86, Apr. 15, 1955, p. 792-803.
Materials used, production methods, machines and applications. Diagrams, photographs. (G3)

95-G. Machinability of Stainless Steels. *Materials & Methods,* v. 41, Apr. 1955, p. 137.
Effect of tool angle and heat treating on machinability. (G17, SS)

96-G. Electronic Control of Machine Tools. *Mechanical World and Engineering Record,* v. 135, Apr. 1955, p. 158-161.
Several forms of tracer control equipment which are applicable to a wide range of machine tools. Diagrams, photographs. (G17)

97-G. Phosphate Coating Retention During Cold Extrusion of Artillery Shells. Lloyd O. Gilbert, Stanley L. Eisler, Jodie Doss and W. Dennis McHenry. *Metal Finishing,* v. 53, Apr. 1955, p. 56-58, 61.
Use of coating containing radiophosphorus. Approximately 89% of the coating remained after extrusion. Photographs, tables. 8 ref. (G5, G21, CN)

98-G. Factors Influencing the Drilling of Titanium. *Metal-Working,* v. 11, May 1955, p. 20-21.
Type of drill to use, feed and point angles and general rules for drilling. Graphs, table, photographs. (G17, Ti)

99-G. Factors Affecting Machinability and Tool Wear in Working Copper and Its Alloys. *Metal-Working,* v. 11, May 1955, p. 22-25.
Cutting speed, surface finish and accuracy of machined work. Tables. (G17, Cu)

100-G. Surface Finish, Dimensional Accuracy and Alteration in Structure of Workpieces Machined by Electric Methods. H. Opitz. *Microtecnic (English Ed.),* v. 9, no. 1, 1955, p. 14-20.
Methods found for machining even the hardest materials such as stellite, hard metals and magnetic alloys. Diagrams, micrographs, graphs. 4 ref. (G17)

101-G. Precision Contour Rolling of Metals. A. E. Felt. *Tooling and Production,* v. 21, Apr. 1955, p. 55-58.
Contour rolling is closely integrated with precision forging and forming, flash welding and fusion welding—to economically produce

lighter and stronger structures. Diagrams. photographs. (G11)

102-G. (French.) **Method of Measuring the Effectiveness of Cutting Lubricants.** P. Eugene. *Revue universelle des mines,* v. 11, ser. 9, no. 3, Mar. 1955, p. 101-110.

Determination and calculation of behavior of cutting fluids under various machining conditions. Diagrams, tables, photographs, graphs. 4 ref. (G21)

103-G. Machining Aluminium. *Aluminium Development Association, Information Bulletin No.* 7, Dec. 1954, 56 p.

Workshop practices used in machining aluminum and aluminum alloys. Tables, photographs, diagrams. (G17, Al)

104-G. Cope Talks on Draw Dies. XXVII. Stainless and Nickel Alloys Require Stronger Draw Dies. Stanley R. Cope. *American Machinist,* v. 99, Apr. 25, 1955, p. 122-124.

Requirements in design of draw dies used for blanking, forming and drawing and diameter reductions. Tables. (To be continued.) (G4, SG, Ni)

105-G. How to Select Wheels for Grinding Tool Steel. Clifton C. Nickerson. *American Machinist,* v. 99, May 9, 1955, p. 121-125.

Classification of SAE toolsteels by their grinding characteristics is the basis for selecting the right grinding wheel. Tables. (G18, TS)

106-G. Cold Power Spinning Saves Material, Cuts Costs. Kenneth W. Stalker and Kenneth W. Moore. *American Machinist,* v. 99, May 9, 1955, p. 126-131.

Advantages, equipment, lubricants and procedures for hydrospinning. Diagrams, photographs, micrographs. (G13)

107-G. American Machinist Reference Book Sheet. Press Tools for Bending. Don R. King. *American Machinist,* v. 99, May 9, 1955, p. 171, 173, 175.

Schematic drawings of press tools serve as reference guide for intelligent selection of the proper tools. Diagrams. (G6)

108-G. Cutter Design and Application for Face-Milling Cast Iron and Steel. O. W. Boston and W. W. Gilbert. *American Society of Mechanical Engineers, Paper No.* 54—A-51, 1955, 16 p.

Power and cutter life are averaged for various grades of cast iron, tool materials, feed, depth, width of bar, number of teeth in the cutter and cutting speed. Table, graphs, diagrams. (G17, CI, ST)

109-G. The Friction Process in Metal Cutting. Iain Finnie and M. C. Shaw. *American Society of Mechanical Engineers, Paper No.* 54—A-108, 1955, 12 p.

It is shown that a coefficient of friction is inadequate to characterize the friction process in cutting, being mainly an indication of the normal stress on the tool face, and thus strongly dependent on the shear process in cutting. Table, graphs, photographs. 18 ref. (G17, Q9)

110-G. Temperature Distribution at the Tool-Chip Interface in Metal Cutting. B. T. Chao and K. J. Trigger. *American Society of Mechanical Engineers, Paper No.* 54—A-115, 1955, 26 p.

Rapid, iterative method for computing temperatures. Calculation shows that maximum temperature occurs at a point near the trailing edge of the contact when chips are produced at conventional feeds and speeds with sintered-carbide tools. Graphs, diagrams, photograph, tables. 27 ref. (G17)

111-G. The Effect of Wheel-Work Conformity in Precision Grinding. Robert S. Hahn. *American Society of Mechanical Engineers, Paper No.* 54—A-178, 1955, 10 p.

Experimental results show that the rate of metal removal varies as the 0.18 power of the curvature difference. Two modes of grinding action are recognized, one in which stock removal is proportional to work speed and independent of wheel speed and the other where the reverse is true. Graphs, diagrams. (G18)

112-G. The Mechanics of the Simple Shearing Process During Orthogonal Machining. Bernard W. Shaffer. *ASME, Transactions,* v. 77, Apr. 1955, p. 331-336.

Chip formation analyzed; analytical expressions developed for the force required to machine a given material with a tool having a prescribed coefficient of friction. Diagrams, graphs. 14 ref. (G17)

113-G Measurement of Cutting Forces. *Automobile Engineer,* v. 45, Apr. 1955, p. 167-171.

Study of cutting phenomena, by measuring the forces involved, based on influences of cutting speeds, coolant, heat treatment and tool material. Photographs, diagrams, graphs. (G17)

114-G. Cold Extrusion Marches On. I. James M. Leake. *Finish,* v. 12, May 1955, p. 27-28, 74.

History of cold forming; technical description of various phases of the process. Photographs. (G5, ST)

115-G. Deep Drawing Aluminum Alloys. James K. Wareham. *Machine and Tool Blue Book,* v. 50, May 1955, p. 155-167.
Alloy selection, equipment, tool design, tool finish and lubricants. Photographs, tables, diagrams. (G4, Al)

116-G. Wrought Carbon and Alloy Steel: Drawing Properties. Carter C. Higgins. *Machine Design,* v. 27, May 1955, p. 158-161.
Requirements and production characteristics. Table, photographs. (G4, CN, AY)

117-G. Wrought Carbon and Alloy Steel: Machinability. Francis W. Boulger. *Machine Design,* v. 27, May 1955, p. 162-166.
Machinability ratings and machining speeds for number of grades of steel. Variations in composition and properties in relationship to machining conditions and surface finish. Table, graphs, micrographs. (G17, CN, AY)

118-G. Wrought Carbon and Alloy Steel: Cold Heading Properties. David H. Samuelson. *Machine Design,* v. 27, May 1955, p. 176-178.
Production procedures, headability ratings for various steels. Tables, photographs, diagrams, graph. (G10, CN, AY)

119-G. Brass, Bronze and Copper. Arthur I. Heim. *Machine Design,* v. 27, May 1955, p. 205-212.
Stamping, drawing, shearing, forming, bending, cold and hot forging, heading, upsetting, machinability. Tables, photographs. (G general, F22, Cu)

120-G. 18 Tips on Practical Stamping Design. Federico Strasser, *Machine Design,* v. 27, May 1955, p. 232-235.
Suggestions for lowering stamping costs. Diagrams. (G3)

121-G. Milling With Carbide Can Be Profitable. Douglas C. Cunningham. *Machinery,* v. 61, May 1955, p. 161-167.
Advantages and applications of carbide milling tools. Photographs, diagrams. (G17)

122-G. Skiving. John P. Wright. *Machinist (London),* v. 99, Apr. 8, 1955, p. 623-630.
What it is and can do, where to use it, how to design and make cutters, ideas in toolholders. Diagrams, photographs. (G17)

123-G. Chip Control Steps-Up Gear-Shaper Output. J. F. Jones. *Machinist (London),* v. 99, May 1955, p. 632-637.
Slight change in rake angle gives essential chip-flow control. Photographs, diagrams, graphs. (G17)

124-G. Hydrospinning Aircraft Components. J. A. Logan. *Modern Machine Shop,* v. 27, May 1955, p. 122-123.
Machine tool squeezes cold alloy steels into desired shapes, reducing production time and costs. Photographs. (G13, AY)

125-G. Tapping Problems Traceable to 16 Machining Conditions. Harry Conn. *Screw Machine Engineering,* v. 16, May 1955, p. 45, 48-49.
Most common machining problems and their solution. Graphs, tables. (G17)

126-G. Thread Rolling: Diversification Within a Method. *Steel,* v. 136, Apr. 25, 1955, p. 100-101.
With a change in tooling, the thread roller can form close tolerance threads and can roll worms, splines and even gears. Photographs, diagrams. (G12)

127-G. Precision Radial Draw Forming. Joseph Fredericks. *Tooling and Production,* v. 21, May 1955, p. 83-87.
Equipment and procedures for production of jet engine parts. (G4)

128-G. Inert-Gas Metal-Arc Cutting. R. S. Babcock. *Welding Journal,* v. 34, Apr. 1955, p. 309-315.
Consumable electrode cutting process for straight-line, circular and shape cuts on nonferrous metals. Diagrams, graphs, photographs, micrographs, table. (G22)

129-G. Electrochemical and Electromechanical Machining of Metals at Low Voltages. V. K. Nevezhin. *Henry Brutcher Translation No.* 2911, 18 p. (From *Elektrichestvo,* 1951, no. 11, p. 62-70.) Henry Brutcher, Altadena, Calif.
Process is based on erosion of material of the electrodes under the action of a nonstationary electric discharge. Graphs, diagram, circuit diagram, tables, oscillograms. 2 ref. (G17)

130-G. Ultrasonic Machining of Holes in Hard Materials. M. M. Pisarevskii. *Henry Brutcher Translation No.* 3484, 7 p. (From *Stanki i Instrument,* v. 25, no. 5, 1954, p. 16-20.) Henry Brutcher, Altadena, Calif.
Previously abstracted from original. See item 438-G, 1954. (G17)

131-G. Cold Working of Metals. J. G. Wistreich. *Iron and Steel Institute, Journal,* v. 180, May 1955, p. 51-59.
Particular importance is attached to concept of tool-stock configuration and its role in determining the

properties of end products, tool loads and machine size. Diagrams, micrographs, graphs. 23 ref. (G general)

132-G. Milling Goes Chemical. *Steel,* v. 136, May 16, 1955, p. 120-121.

Used for jobs on which mechanical milling is slow or difficult. Photographs. (G17, Al)

133-G. (French.) **Better Cutting at a Better Price.** H. Bertault and J. P. Hubert. *Revue de la soudure (Brussels),* v. 11, no. 1, 1955, p. 16-26.

Methods of lowering oxygen and acetylene consumption and of improving cutting section in a given period of time. Diagrams, photographs, table. (G22)

134-G. (Russian.) **Automatic Regulation of Cutting Speed in Relation to the Temperature of the Cutting Edge of the Cutter.** P. N. Malakhov. *Vestnik Mashinostroeniia,* v. 35, no. 4, Apr. 1955, p. 26-30.

Automatic apparatus and circuit, mode of operation, and its testing for industrial use. Circuit diagram, graphs, photograph, table. 2 ref. (G17, CI, ST)

135-G. (Russian.) **Derivation of the Criterion of Interaction of Electrode Substances During the Electrospark Finishing of Metals.** G. V. Gusev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 763-765.

Physical constants of the electrodes and parameters of the impulse electrical discharge. 5 ref. (G17)

136-G. Cope Talks on Draw Dies. XXVIII. Drawing Dies for Stainless Require Modifications. Stanley R. Cope. *American Machinist,* v. 99, May 23, 1955, p. 130-132.

To avoid scratches and score marks on deep-drawn stainless steels or nickel alloys, choose die materials with suitable characteristics. Diagrams. (G4, SS, Ni)

137-G. Continuous Blank Machining in Gear Production. J. J. McCabe. *Automation,* v. 2, June 1955, p. 26-29.

Precision boring using parts handling mechanisms and gage actuated tool setting controls. Photographs, diagram. (G17)

138-G. Electronic Consideration in the Theory and Design of Electric Spark Machine Tools. Everard M. Williams and James B. Woodford, Jr. *Institute of Radio Engineers, Transactions on Industrial Electronics,* PGIE-2, Mar. 1955, p. 78-81.

Process used, dielectric, type of pieces machined and techniques of current generation. Photographs, circuit diagram. 3 ref. (G17)

139-G. How to Understand Cold Working of Metals. Samuel Storchheim. *Metalworking Production,* v. 99, May 13, 1955, p. 845-851.

Effects of prior processing on the metal, its grain structure and work hardening rate. Graphs, photographs, micrographs, tables. (G general)

140-G. Mechanization Applied to Oxygen Cutting. R. L. Deily. *Welding Journal,* v. 34, May 1955, p. 433-439.

Automatic material handling equipment and electrical controls for routine high-quantity production of precision work. Photographs, graphs. (G22)

141-G. Automated Setup for Handling of Workpieces in Ford Transmission Plant. *Automotive Industries,* v. 112, June 1, 1955, p. 68-69, 122, 124.

Equipment and procedures for automatic control of machine tools for production of gears and shafts. Photographs, diagram. (G17, A5)

142-G. Machining Hard Materials by Ultrasonics. *Canadian Metals,* v. 18, May 1955, p. 45-46.

Equipment and operating procedures. Diagram, table, photograph. (G17)

143-G. The Grinding of Steel. XXV. Grinding and Finishing Machines. *Edgar Allen News,* v. 34, May 1955, p. 109-110.

Description, operating techniques and capabilities of internal grinding machines. Photograph. (To be continued.) (G18, ST)

144-G. Cold Extrusion Marches On. II. Materials, Lubrication, Tooling, Pressures and Production Information. James M. Leake. *Finish,* v. 12, June 1955, p. 39-40, 86, 88.

Advantages and processes. (G5, CN)

145-G. "Start From Scratch" Savings. Howard E. Jackson. *Modern Industrial Press,* v. 17, May 1955, p. 13 + 7 pages.

Description of a compact and highly efficient steel fabricating unit. Photographs. (G general, CN)

146-G. Coated Abrasive Machines in Close Tolerance Work. A. W. Bell. *Modern Machine Shop.* v. 28, June 1955, p. 106-109.

Outstanding production applications of coated abrasive machinery capable of removing metal rapidly to extremely exacting tolerances. Photographs. (G18)

147-G. New Machine Extends Thread Rolling Process. *Modern Machine Shop,* v. 28, June 1955, p. 128-131.

Two-roll design principle is applicable to wide range of workpieces. Photograph, diagrams. (G12)

148-G. Reclamation of Used Oils. V. Cutting Oils and Coolants. E. G. Ellis. *Scientific Lubrication,* v. 7, May 1955, p. 19-25.

Treatment of cutting oils and coolants and the disposition and treatment of swarf. Photographs, diagram. (G21)

149-G. Sectional Dies. Federico Strasser. *Sheet Metal Industries,* v. 32, no. 337, May 1955, p. 339-343, 384.

Some aspects of their design, construction and use. Diagrams. (G1)

150-G. Shot Peening for Safety. *Steel,* v. 136, May 23, 1955, p. 102-103.

Improving fatigue strength of materials at points of greatest stress. Photographs. (G23, Q7)

151-G. Precision Contour Rolling Teams With Welding to Produce Steel Propellers. A. E. Felt. *Steel Processing,* v. 41, May 1955, p. 305-309.

Contour rolling, fabrication, heat treating, finishing and balancing of steel propeller blades. Photographs, diagrams.
(G11, K general, T24, ST)

152-G. The Design of Simple Dies for Bending Operations. W. M. Halliday. *Steel Processing,* v. 41, May 1955, p. 311-314, 331.

Problems of the tool designer concerning questions of die-design and construction; the particular principles of bending action to be employed; what portions of the component shape are to be reproduced in each die; how many dies have to be used; and how such tooling or production costs may be maintained as low as possible. Diagrams. (G6)

153-G. Slow Speed Sawing—Reports on a Growing Technique. *Steel Processing,* v. 41, May 1955, p. 317-318.

Inexpensive box strapping and clock spring material will cut stainless steels, mild steels and titanium. Photographs. (G17)

154-G. Wet Machining of Cast Iron Increases Tool Life. John A. Boyd. *Tool Engineer,* v. 34, June 1955, p. 81-82.

Best current solution to cast iron machining problems is the use of a high-wetting and dispersing water soluble compounds with special rust-inhibiting additives. Photographs. (G17, CI)

155-G. How to Select and Use Die Steels. *Tool Engineer,* v. 34, June 1955, p. 97-99.

Some of the important considerations in choice of die materials. Diagrams, tables. (G17, T5, TS, AY)

156-G. Analysis of Ear Formation in Deep-Drawn Cups. Arthur J. McEvily, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3439, May 1955, 7 p.

A method for predicting earing behavior proposed, based on the plastic properties of single crystals and a knowledge of the preferred orientation of the blank material. Proposed method of prediction is in agreement with reported experimental results. Graphs, diagrams. 7 ref. (G4)

157-G. (Russian.) **Method of Calculating the Relative Economy of Different Operations by Oxygen Cutting.** S. G. Guzov. *Svarochnoe Proizvodstvo,* 1955, no. 5, May 1955, p. 9-11.

Calculative factors include thickness of steel to be cut, cost of operation of gas cutter, whether cutting is straight or figure, etc. Graphs, table. (G22, ST)

158-G. Controlled Stretch-Forming. *Aircraft Production,* v. 17, June 1955, p. 234-236.

Method of producing consistent workpieces by means of a servocontrol system. Diagrams, photograph. (G9)

159-G. Turret Machining. *Aircraft Production,* v. 17, June 1955, p. 237-241.

Methods of sequence control, operational control, turret control and screw cutting. Photographs, diagrams. (G17)

160-G. Powder-Metal Cutters Promise New Milling Economy. Horace Frommelt. *American Machinist,* v. 99, June 6, 1955, p. 128-129.

Disposable milling cutters sintered with thin carbide blades in place may cost less than regrinding, provide longer tool life, and faster cutting. Photographs, diagrams.
(G17, H15)

161-G. Cope Talks on Draw Dies. XXIX. Apply Correct Clearances and Speed When Drawing Stainless. Stanley R. Cope. *American Machinist,* v. 99, June 6, 1955, p. 130-133.

Shaving, bending and forming dies, lubricants, cemented-carbide die parts, press speeds. Diagrams, tables. (G4, SS)

162-G. Computer Techniques Extended to Machine Tool Control.

Electrical Manufacturing, v. 55, June 1955, p. 124-132, 330, 332.

New director control systems using static devices and switches without electrical contacts. Examples of extension of automaticity to sequencing controls. Photographs, graph, diagrams. (G17)

163-G. Residual Stresses in Heavy-Wall Cylinders. J. H. Faupel. *Franklin Institute, Journal,* v. 259, May 1955, p. 405-419.

Residual stress resulting from autofrettage of steel cylinders appears to be related to the hardness and/or structure of the steel employed. Tables, graphs, diagram. 3 ref. (Q25, ST)

164-G. Dies Travel With Strip in New High-Speed Press. E. C. Beaudet. *Iron Age,* v. 175, June 16, 1955, p. 83-85.

Press design incorporates dies which move with the strip and continuous coil feeding. Advantages include less setup time, variable feed lengths, and low maintenance. Photographs. (G2)

165-G. Sliding Friction Test for Metalworking Lubricants. W. J. Wojtowicz. *Lubrication Engineering,* v. 11, May-June 1955, p. 174-177.

Procedure that gives pertinent information regarding ability of a lubricant to decrease friction and to inhibit metallic welding during deep drawing. Experimental data confirm practical experience and indicate that there exists a specificity between lubricants and metals. Tables, graph, diagram. 14 ref. (G21, Q9)

166-G. Maintenance of Water-Soluble Machining Coolants During Use. J. A. Prevel. *Lubrication Engineering,* v. 11, May-June 1955, p. 178-179.

Physical and chemical methods of control which extend the life of the coolants. (G21)

167-G. Application and Grade Selection of Tungsten Carbide Tooling. Edward J. Novack. *Machine and Tool Blue Book,* v. 50, June 1955, p. 157-162.

Three groups of tungsten carbides for machining purposes, including the edge wear resistant grades for cutting plastics, cast iron, bronze, aluminum and other nonferrous and abrasive materials, the crater resistant types, and the intermediate group having more or less balanced compositions. Table, diagrams. (G17, W)

168-G. High Feed Rate Milling Made Practical With Solid Carbide Blades. R. C. Legge. *Machine and Tool Blue Book,* v. 50, June 1955, p. 168-170, 172.

Discusses trend toward heavy solid carbide mechanically held inserts in single and multiple-point cutting tools, and describes their advantages. (G17)

169-G. "Chem-Mill" on a Production Basis at North American. Manuel Sanz. *Machinery,* v. 61, June 1955, p. 156-163.

Application of etching process which enables the convenient reduction of sections on metal parts after forming or forging without any change in important dimensions. Photographs. (G17)

170-G. Electronic Control Makes Boring Mill Automatic. *Metalworking Production,* v. 99, May 20, 1955, p. 910-912.

Integral electronic copying equipment enables flywheels to be profile turned in an automatic cycle. Photographs, diagram. (G17)

171-G. New Rail-Grinder Train—Takes Off the Rough Spots. *Railway Track and Structures,* v. 51, June 1955, p. 30-33.

As train moves along at about 2 m.p.h., 96 power-driven abrasive wheels, mounted on special truck assemblies beneath cars, grind out corrugations and other surface irregularities on both rails simultaneously. Photographs. (G18)

172-G. Automatic Turret Lathe Control. Leonard Hesse. *Screw Machine Engineering,* v. 16, June 1955, p. 40-41.

Turret lathe part produced by magnetic tape control of the machine tool with automatic compensation for tool adjustment. Photographs, diagram. (G17)

173-G. How to Buy Cutting Fluids. John A. Boyd. *Steel,* v. 136, June 6, 1955, p. 80-82.

Factors to be considered in buying and testing cutting fluids. Photographs, graphs, table. (G21)

174-G. New Trend in Carbide Tooling. A. S. Rogers. *Tooling and Production,* v. 21, June 1955, p. 77-80.

Analysis of features, advantages and limitations of the new tools. Photographs. (G17)

175-G. (English and Spanish.) **Metal Machining. IV. Work Materials and Tool Materials.** W. Alfred Carter. *Machinery Lloyd (Overseas Ed.),* v. 27, May 21, 1955, p. 69-73, 75-77.

Effect of structure of work pieces on the type of tool material used. Photograph, diagram, micrograph. (G17)

176-G. (Dutch.) **Deep-Drawing Investigation by the Metal Institute. T.N.O.** J. H. Zaat. *Metalen,* v. 10, no. 9, May 15, 1955, p. 117-121.

Testing methods for sheet metals and testing method designed by the institute. Diagrams. 1 ref. (G4, Q23)

177-G. (French.) **Contribution to the Study of the Stamping of Metals.** Lucien Godtschalck. *Métaux, Corrosion-Industries,* v. 30, no. 354, Feb. 1955, p. 47-77.

Mechanical characteristics of stamping determined by observing metal deformations and by analysis of tension and stamping diagrams. Micrographs, tables, diagrams, graphs, photographs. (To be continued.) (G3)

178-G. (Polish.) **Electrospark Treatment of Wire-Drawing Dies Made of Sintered Carbides.** Zygmunt Steininger. *Hutnik,* v. 22, no. 3, Mar. 1955, p. 87-89.

Design of electrospark machining equipment. Use and operation of the device and its advantages over mechanical polishing methods. Diagrams, circuit diagram, photograph, table. 17 ref. (G17, L10, C-n)

179-G. **What Is the Best Screw-Machine Stock?** Richard F. Harvey. *American Machinist,* v. 99, June 20, 1955, p. 113-115.

Results of extensive production tests on the machinability of C1119 steel. Photographs, tables, diagram, micrographs. (G17, CN)

180-G. **Toxic Materials Machined Safely.** Donald P. O'Neil. *American Machinist,* v. 99, July 4, 1955, p. 125-129.

Design of hoods, allowable concentrations in the air and operating rules that should be followed when machining beryllium. Diagrams, photographs, tables. (G17, Be)

181-G. **What Size Nose Radius?** Robert E. Nixon. *American Machinist,* v. 99, June 20, 1955, p. 138-139.

How nose radius is constructed, what it does in the operation of the tool, how to determine what size radius should be used for different conditions and materials. Diagrams, graphs. (G17, C-n)

182-G. **The Grinding of Titanium Alloys.** C. T. Yang and M. C. Shaw. *ASME, Transactions,* v. 77, July 1955, p. 645-660.

Influence of a wide variety of operating and grinding-wheel variables reveals the most important quantities to be grinding wheel speed, type of abrasive, and grinding fluid. Table, graphs, diagrams, micrographs, photographs. (G18, Ti)

183-G. **Helical Carbide Cutters.** *Canadian Metals,* v. 18, June 1955, p. 47, 50, 52.

Problems in the manufacture and use of the cutters are correct type of steel for cutter body, economies of tipping, brazing difficulties, grinding techniques. Photographs, diagrams. (G17, WC)

184-G. **Die Design Solves Small Part Production Problems.** Federico Strasser. *Iron Age,* v. 175, June 9, 1955, p. 78-80.

Design of punch for small parts, made from thin stock and with closely spaced holes, results in better production at lower costs. Diagrams. (G2)

185-G. **Machine Tools—1855 to 1955.** *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2E-20E.

Development and prospects of machine tools and their accessories. Photographs. (G17)

186-G. **Presswork—1855 to 1955.** *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 21-161.

Review of progress in hot and cold pressing and forging. Photographs. (G1, F22)

187-G. **What Happens When Speeds Are Increased?** R. Tourret. *Metalworking Production,* v. 99, May 27, 1955, p. 930-932.

Data published on the effect of increased cutting speeds. Graphs. 22 ref. (G17)

188-G. **Automation.** *Metalworking Production,* v. 99, June 10, 1955, p. 1013-1076.

Developments during the last nine years. Machine tools, control systems, inspection procedures, computers. (G17, A5)

189-G. **Solve Special Shell Problems With Proved Die Design Methods. XXVI.** Stanley R. Cope. *Metalworking Production,* v. 99, June 17, 1955, p. 1102-1105.

Design of drawing dies for forming a shell with corrugations, two levels, or pockets. Diagrams. (G4)

190-G. **Contribution to the Theory of Frictional Wear of Turning Tools.** E. Bickel. *Microtecnic (English Ed.),* v. 9, no. 2, 1955, p. 53-57; disc., p. 58.

Four phenomena of cutting edge failure considered according to cause and effect. Graphs. (G17, Q9)

191-G. **Low Temperature Cooling, a Means of Increasing Cutting Tool Life.** G. Pahlitzsch. *Microtecnic (English Ed.),* v. 9, no. 2, 1955, p. 65-69.

Tests indicated a 42% extension of

tool life and an increased savings in manufacturing and tool costs. Graphs, photograph. (G21)

192-G. New Method for Evaluating Coolant Efficiency. F. Eugene. *Microtecnic (English Ed.),* v. 9, no. 2, 1955, p. 70-80.

Evaluation of coolant effect in machining operations may be satisfactorily made through measurement of specific tool abrasion. Diagrams, tables, photographs, graphs. 4 ref. (G21)

193-G. The Fundamentals of Progressive Tooling. J. A. Grainger. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 405-409, 452.

Basic fundamentals, types, relief of the strip on follow-on tools, consideration of the number of stages in a tool, scope of progressive tooling, die construction. Photographs, diagrams. (To be continued.) (G17)

194-G. Spin Drawing Rolls Away Costs. William E. Dean. *Steel,* v. 136, June 27, 1955, p. 84-86.

It is possible for one machine to produce the same deep drawn parts normally required of a line of presses; equipment investment is less, costly dies are eliminated. Photographs. (G13)

195-G. Save on Snagging. John A. Mueller. *Steel,* v. 136, June 20, 1955, p. 110-112.

Effect on production rate, power consumption and wheel performance as determined by reduced wheel diameter, pressure on the wheel, and open and dense structure of snagging wheels. Photographs, graphs, table. (G18)

196-G. Ultrasonic Impact Grinding. Ralph Moschella. *Steel Processing,* v. 41, June 1955, p. 378-381, 399.

Principles, equipment, methods, applications. Diagrams, photographs. (G18)

197-G. Machinability Testing of High-Phosphorus Gray Iron. Edward A. Loria. *Western Machinery and Steel World,* v. 46, June 1955, p. 76-81.

Tests comprise tool wear turning tests on individually cast rings, constant pressure turning tests on arbitration bars, drill penetration tests on small rectangular bars and tapping energy tests on very small lock-nut castings. Photographs, graphs, tables, micrographs. 7 ref. (G17, CI)

198-G. Electrospark Marking of Hardened Tools. F. F. Cherepanov. Henry Brutcher, Altadena, Calif. 4 p. (Condensed from *Stanki i Instrument,* v. 25, no. 5, 1954, p. 29-30.) Henry Brutcher, Altadena, Calif.

Development of a method for the marking of mass-produced tools which has proved superior to all other methods. Table, photographs. (G17)

199-G. Machining of Holes by the Electrospark Process. V. E. Dumpe. *Henry Brutcher Translation No.* 3496, 8 p. (Abridged from *Vsetnik Mashinostroeniya,* v. 34, no. 12, 1954, p. 51-55.) Henry Brutcher, Altadena, Calif.

Study of electrospark machining of holes in steel for rate of metal removal, dimensional accuracy and surface roughness of the holes machined, using a large and small electrospark unit. Graphs, photographs, table. 1 ref. (G17, ST)

200-G. New Process of Production of Metal-Powder Tools for the Electrospark Machining of Metal Parts. E. A. Volodin and L. A. Kovsharova. *Henry Brutcher Translation No.* 3497, 5 p. (From *Vestnik Mashinostroeniya,* v. 34, no. 12, 1954, p. 56-57.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 67-G, 1955. (G17, H general, Cu)

201-G. Influence of Lubricants Upon the Surface Flow of Metal. S. Ya. Veiler. *Henry Brutcher Translation No.* 3519, 6 p. (From *Doklady Akademii Nauk SSSR,* v. 99, no. 6, 1954, p. 1025-1027.) Henry Brutcher, Altadena, Calif.

Study of influence of different lubricants upon tangential force, microstructure and microhardness through flow in surface zone. Photographs, tables. 4 ref. (G21, M27, Q29, ST, Cu)

202-G. (French.) **A study of the Punching of Metals.** Lucien Godtschalck. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 110-133.

Details of tests on influence of the nature and surface state of the punched metal, and on heterogeneity of soft openhearth steel. Tables, graphs. (To be continued.) (G2, CN)

203-G. (French.) **Contribution to the Study of the Stamping Metals.** Lucien Godtschalck. *Métaux, Corrosion-Industries,* v. 30, no. 356, Apr. 1955, p. 155-172.

Influence of play between punch and die, of stamping rate, metal thickness and die lubrication. Diagrams, tables, graphs, photograph. 18 ref,. (G3)

204-G. (German.) **Several Methods of Economical Belt Grinding.** G. Pahlitzsch and H. Windisch. *Metall,* v. 9, nos. 11-12, June 1955, p. 496-499.

Effect of smooth and grooved supporting disks on grinding efficiency. Photograph, graph, table. 4 ref. (To be continued.) (G18)

205-G. (German.) **Oxy-Propane Flame Cutting.** G. Oldenburg. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 124-128.

Chemical properties of various liquefied gases, comparison of oxygen consumption, heat evolution, and combustion rate of acetylene and propane, effect of cutting angle on cutting rate, advantages of cutting with propane. Graphs, diagrams, tables. (G22)

206-G. (German and French.) **The Machining of Light Metals by Cutting.** Jean-Jacques Desherault. *Aluminium Suisse,* v. 5, no. 3, May 1955, p. 76-92.

Effect of shape and properties of materials, machines, cutting tools, cutting conditions and lubrication on machinability; classification of light metals; description of different types of machining operations. Diagrams, graphs, photographs, tables.
(G17, Al)

207-G. (German and French.) **Machining Light Metals With Hard-Metal Cutting Tools.** E. Frey and P. Frey. *Aluminium Suisse,* v. 3, no. 1, 1955. p. 93-96.

Proper conditions for lathing, milling, and reaming. Tables, photographs, diagram. (G17, Al)

208-G. (Polish.) **High-Speed Machining and Cutting With Kolesow-Type Machine Tools.** Jan Kaczmarek. *Przeglad Techniczny,* v. 75, no. 3, Mar. 1954, p. 94-98.

Calculation of factors in cutter angle, depth and rapidity of feed, opposition to cutting, materials being machined, heat generated, machining time and forces. Graphs, diagrams, photograph. 8 ref.
(G17, ST, CI)

209-G. (Pamphlet.) **The Effect of the Cutting Fluid When Turning Titanium.** PB 111478. 15 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.50.

Cutting speed-tool life of each of the fluids is plotted as a curve in the report and the effectiveness of each fluid is evaluated.
(G21, G17, Ti)

210-G. **Radial Draw-Forming.** *Aircraft Production,* v. 17, July 1955, p. 255-261.

Compression-control of material during the forming process; cold forming of titanium-alloys. Description of equipment and operating procedures. Photographs, diagrams. (G9, Ti)

211-G. **Control Data.** R. H. Booth. *Aircraft Production,* v. 17, July 1955, p. 262-267.

Function of the electronic computer in machine-tool and production-process control. Diagrams, circuit diagram, graph, photographs. (G17)

212-G. **Machining Titanium. II. Investigations Into the Effects of Coolant and Hardening Properties When Machining Ti-150A.** J. T. D. Holt and J. Purcell. *Aircraft Production,* v. 17, July 1955, p. 279-281.

Tool life, cutting fluids, inflammability of swarf. Photographs, graphs, table, diagrams.
(G17, G21, Ti)

213-G. **Hydraulic Spinning.** *Aircraft Production,* v. 17, July 1955, p. 282-286.

Forming process for the production of tubular and conical parts and rings of profiled cross section. Photographs, diagrams. (G13)

214-G. **Tangential Stretch-Forming.** *Aircraft Production,* v. 17, July 1955, p. 290-292.

Details of the Müller press with counter-drawing attachment for local re-drawing operations. Photographs, diagram. (G9)

215-G. **Metal Gathering: What It Is and How It Works.** W. E. Achor. *Iron Age,* v. 176, July 14, 1955, p. 99-102.

This process accumulates plastic metal under pressure at the ends or in the middle of tubing or bar stock. Increased strength, good grain flow and uniform metallurgical properties are obtained. Savings in handling, reduction in weight, elimination of machining are often possible. Diagrams, photographs.
(G general)

216-G. **Cold Power Spinning Will Save Material and Cut Costs.** Kenneth W. Stalker and K. W. Moore. *Metalworking Production,* v. 99, July 1, 1955, p. 1173-1178.

Equipment and methods for high-pressure, cold plastic deformation of metals to form hollow cones and cylinders from simple flat blanks or pre-formed shapes which can reduce cost of making some parts as much as 75% while boosting strength 15% or more. Photographs, diagrams. (G13)

217-G. **Using Punched-Card Equipment for Automatic Machine Tool Control.** Alan H. Stillman. *Product*

Engineering, v. 26, June 1955, p. 172-176.
Description of computers and converters. Calculations for noncircular gears produced by automatic gear-cutting control. Photographs, diagrams. 2 ref. (G17)

218-G. Beading Techniques for Strengthening Sheet Metal Parts. Bernhard Rogge. *Product Engineering,* v. 26, July 1955, p. 183-188.
Design criteria and specifications for sheet, angle, tube and assembly beading in steel, aluminum, magnesium, and other common materials. Diagrams, tables. (G11, Al, Mg, St)

219-G. Production Machining of Tools and Dies by Electrical Discharge. Richard Stoke. *Tooling and Production,* v. 21, July 1955, p. 51-53.
Drilling, grinding, tapping, boring and shaping the higher alloyed metals and metals of greater hardness and density are now being done by electrical discharge machining within any desired tolerance. Tables, photographs. (G17)

220-G. Special Lathe at the National Physical Laboratory for Cutting and Forming Fine-Pitch Screw Threads. V. W. Stanley. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 329-344; disc., p. 344-345.
A high-precision lathe capable of producing fine-pitch screws ranging from about 100 to 30,000 threads per in. Diagrams, photographs, graph. 3 ref. (G17)

221-G. Gear Shaving. A. Sykes. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 359-377; disc., p. 404-413.
Cutters and cutting processes; inspection methods. Photographs, diagrams. (G17, S14)

222-G. The Practical Approach to Engineering Fine Surfaces. D. B. Ebsworth. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 629-651; disc., p. 651-664.
Principles, equipment and methods of honing and lapping. Diagrams, graphs, photographs, table. (G19)

223-G. (Russian.) **Machining of Non-Rigid (Hollow) Shaft.** G. S. Beliaev. *Vestnik Mashinostroeniia,* v. 35, no. 6, June 1955, p. 41-44.
Operation; adjustment of shafts on lathes, optimum machining conditions. Tables, diagrams. (G17)

224-G. How to Machine Uranium. Alexander Denst and H. V. Ross. *American Machinist,* v. 99 Aug. 1, 1955, p. 95-97.
Methods developed by AEC. Photographs. (G17, U)

225-G. Gears Untouched by Human Hands. George H. De Groat. *American Machinist,* v. 99, Aug. 1, 1955, p. 111-120.
Automatic loaders and conveyors, tools, inspection and sorting in production of pinion gears. Diagrams, photographs. (G17)

226-G. Fatigue Strength of Flame-Cut Specimens in Black Mild Steel. F. Koenigsberger and H. W. Green. *British Welding Journal,* v. 2, July 1955, p. 313-321.
Shows that the heating effect of the cutting process has no greater influence on the fatigue resistance than the presence of the scale inherently present on mild steel. Table, diagrams, graphs, photographs, micrographs. 4 ref. (G22, Q7, CN)

227-G. Tracer Lathe Saves Setup and Machining Time. Herbert Chase. *Iron Age,* v. 176, July 28, 1955, p. 66-67.
Automatic operations in machining precombustion chambers for diesel engines. Photograph, diagram. (G17)

228-G. How to Control Perishable Tools. George Pascoe. *Machinery,* v. 61, Aug. 1955, p. 139-148.
Practices of the Ford Motor Co. in tool specifications, procurement, inspection, grinding, testing, use and salvage. Photographs, diagram, tables. (G17)

229-G. High-Pressure Forming on Verson-Wheelon Presses. O. E. Wheelon. *Machinery,* v. 61, Aug. 1955, p. 149-155.
Recent developments in the forming of steel sheets with an inflated rubber bag. Photographs, diagrams. (G8, CN)

230-G. Control Tape Prepared From Numerical Data. Edgar L. McFerren. *Machinery,* v. 61, Aug. 1955, p. 178-182.
Magnetic tape prepared electronically directly from numerical data is being used to automatically control a Giddings & Lewis spar and skin-milling machine. Cams or templates are not required, less skilled machine operators can be employed, and tapes can be stored for future production needs. Photographs. (G17)

231-G. Press Tool Devices for Continuous Production From Strip. *Mechanical World and Engineering Record,* v. 135, July 1955, p. 298-301.
Design and application of various

types of stops for blanking dies. Diagrams. (G2)

232-G. Fabricating Titanium Sheet. *Metal Industry,* v. 87, July 15, 1955, p. 43-45.

Proposes method to make the most satisfactory parts from commercially pure sheet, using standard machines and processes, and comparing the techniques with those used in fabricating stainless steel parts. Photographs. (G general, Ti)

233-G. Indentation Pressure of a Smooth Circular Punch. E. Levin. *Quarterly of Applied Mathematics,* v. 13, July 1955, p. 133-137.

Technique used to obtain an upper bound on the punch pressure at the moment of impending plastic indentation. Diagrams, tables. 4 ref. (G2, Q24)

234-G. The Fundamentals of Progressive Tooling. J. A. Grainger. *Sheet Metal Industries,* v. 32, no. 339, July 1955, p. 485-489.

Design of press tools of the follow-on or cut-and-carry types which permit uninterrupted feeding of the stock across the die face. Photographs, diagrams. (G1)

235-G. Putting Machinability Data to Work. M. C. Shaw, N. H. Cook and P. A. Smith. *Tool Engineer,* v. 35, Aug. 1955, p. 81-86.

Applications to tool wear rate, finish obtained and machining costs. Photographs, diagrams, graphs. 2 ref. (G17)

236-G. Heavy-Duty Machining. A. B. Albrecht. *Western Machinery and Steel World,* v. 46, July 1955, p. 74-77.

Use of chip studies, tool forces and horsepower values in selecting proper cutting speeds. Photographs, tables, graphs. (G17)

237-G. Some Bending Characteristics of Cartridge Brass, 70%, and Yellow Brass, 65%, Wire. Lewis E. Thelin and Robert O. Abbott, Jr. *Wire and Wire Products,* v. 30, July 1955, p. 763-766, 813-814.

Data presented in form of value to both metallurgists and tool designers in selection of suitable temper wire for formed parts and possibly will give an indication of the "spring-back", or set for use, when designing bending dies. Photographs, tables. (G6, Cu)

238-G. Machining of Beryllium. Leslie E. Duran. Paper from "The Metal Beryllium". American Society for Metals, p. 273-282.

Machining by turning, milling, drilling, reaming, grinding, sawing, in addition to cutting tools, feeds, and speeds, and comparisons made with more common metals exhibiting similar machining characteristics. Table, diagrams, photographs. 3 ref. (G17, Be)

239-G. (French.) **Machining by Electric Spark.** D. W. Rudorff. *Métallurgie et la construction mécanique,* v. 87, no. 6, June 1955, p. 489 + 5 pages.

Fundamental principles, conditions for operation, equipment. Diagrams, photographs. 3 ref. (G17)

240-G. (German.) **Investigation of the Cutting Properties of WC-TiC-Co Alloys.** H. J. Booss. *Metall,* v. 9, nos. 13-14, July 1955, p. 560-564.

Preparation and analysis of hard metals; influence and composition of free carbon and cobalt content on cutting properties. Tables, graphs. 23 ref. (G17, W, Ti, Co)

241-G. Modern Stainless Steels. *Edgar Allen News,* v. 34, July 1955, p. 157-158.

Methods of drilling, tapping, sawing and milling. Photographs. (To be continued.) (G17, SS)

242-G. The Grinding of Steel. XXV. Grinding and Finishing Machines. *Edgar Allen News,* v. 34, July 1955, p. 159-160.

Description and capabilities of roll grinding, universal and other grinding machines. Photograph, graph. (To be continued.) (G18)

243-G. How to Work Arc-Cast Molybdenum. *Iron Age,* v. 176, Aug. 11, 1955, p. 95-97.

High speed steel and tungsten carbide tools have given good results in machining; in drawing and spinning, both metal and tools should be heated; satisfactory welds are obtained using arc, electrical resistance, percussion and flash welding; special care needed in grinding. Photographs.
(G general, K1, K3, Mo)

244-G. Underwater Miller Machines Nuclear Fuel. S. L. Lindbeck. *American Machinist,* v. 99, Aug. 15, 1955, p. 110-111.

Water pit provides shielding, removes decay heat and suppresses spread of contamination in machining expended reactor fuel. Photographs. (G17, Pu, U)

245-G. Shear-Plane Temperature Distribution in Orthogonal Cutting. J. H. Weiner. *American Society of Mechanical Engineers, Paper* No. 54—A-65, 1954, 16 p. + 1 plate.

Analysis of the temperature distribution along the shear plane due to energy released in the shear deformation. Diagrams, graphs. 8 ref. (G17, Q24)

246-G. Friction in the Sheet Drawing. Hiroshi Yamanouchi and Ikuhiko Hayashi. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 58-60.

Measurements of die pressure and drawing force; influence of die shape; comparison of experimental data with theoretical values. Diagrams, graphs. (G4, Q9)

247-G. The Cutting Mechanism of Brass Containing Lead. Fusao Hayama. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 61-64.

Analysis of machinability by applying plasticity theory to cutting parameters. Graphs, diagram. (G17, Q24, Cu)

248-G. Tools Last Longer, Jobs Machine Faster With Leaded Alloy Steels. H. W. McQuaid. *Iron Age,* v. 176, Aug. 18, 1955, p. 84-86.

Spheroidal dispersed lead (0.15 to 0.35%) in steels permits up to 300% greater production rates and 200% increase in tool life. Table, photographs. (G17, AY)

249-G. Impact (Cold) Extruded Parts. John L. Everhart. *Materials & Methods,* v. 42, Aug. 1955, p. 111-126.

Describes impact extrusion process and discusses sizes, shapes, limitations and applications of parts produced from aluminum and aluminum alloys, steels, magnesium and magnesium alloys, and other nonferrous metals. Photographs, table, diagrams, graphs. (G5, Al, Mg, ST, EG-a)

250-G. Ceramics—Tools of Tomorrow? Ralph S. Towne. *Screw Machine Engineering,* v. 16, Aug. 1955, p. 35-38.

Cutting speeds nine times faster than toolsteels and three times faster than carbides have been used successfully in experimental turning of steel with ceramic tooling. Diagrams, table, photograph. (G17, ST)

251-G. Cutting Applications. Steel Mill Finds Many Uses for Oxygen, Acetylene. Raymond Kopecky. *Welding Engineer,* v. 40, Aug. 1955, p. 34-36.

Illustrates production applications either as an emergency measure or as permanent modifications, usually oxy-acetylene cutting. Photographs. (G22, ST)

252-G. (German.) **Prevention of the Formation of Martensite on Torch Cuts.** Fritz Dechner and Hermann Speich. *Stahl und Eisen,* v. 75, no. 14, July 14, 1955, p. 912-913.

Flame cutting tests on 6 to 30-mm. thick plates of steels St 37, St 50, St 52, and St 70; effects of the plate thickness, feed rate and the steel type on the prevention of hardening phenomena; arrangement of the annealing torch. Table, graphs. 2 ref. (G22, N8, ST)

253-G. Choosing Machine Tools for Medium-Run Production. W. W. Gilbert. *Iron Age,* v. 176, Aug. 25, 1955, p. 211-214.

Criteria should be fastest possible cutting job with minimum vibration, time-saving potential for tooling setups and changes, work handling and maintenance efficiencies. Diagram, photograph. (G17)

254-G. The Manufacture and Tolerancing of Screw Threads on Optical Components, With Special Reference to the R.M.S. Microscope Objective and Nosepiece Threads. L. W. Nickols. *Royal Microscopical Society, Journal,* v. 75, ser. 3, pt. 1, 1955, p. 58-62.

Methods of cutting and inspection of objective and nosepiece threads for R.M.S. microscope. Proposed U. S. standard and recommendations for revision of R.M.S. standard. Tables. (G17, S14, S22)

255-G. Deep Drawing of Nimonic 75 and Stainless Steel. *Sheet Metal Industries,* v. 32, no. 340, Aug. 1955, p. 572-575, 580.

Design and operation of the "Lancastrian" press for making gas turbine units. Photographs, diagrams, table. (G4, Ni, SS)

256-G. Tolerances in Metal Stampings. Federico Strasser. *Steel Processing,* v. 41, Aug. 1955, p. 505-508.

Discussion of ample tolerances, proposed standards, blank increase by tool wear, selection of tool type, forming dies and corrective operations. Diagrams, table. (G3, S22)

257-G. Cold Heading Lubricants. E. Jefferson Crum. *Wire and Wire Products,* v. 30, Aug. 1955, p. 899.

Cold extrusion lubricants and their use on cold heading wire. (G10, G21)

258-G. (German.) **Use of the AGA Joint Planer in the Maintenance of Railroad Tracks.** K. Bombera and V. Trunschitz. *Schweisstechnik,* v. 9, no. 6, June 1955, p. 61-64.

Use of oxy-acetylene flame-planing device in maintenance of railroad crossings. Diagrams, photographs. (G22)

259-G. (German.) **The Deep-Drawing Steels.** Hubert Hoff. *Stahl und Eisen,*

v. 75, no. 15, July 28, 1955, p. 949-956; disc., p. 956-958.

Development in the production of thin sheets and strips, inherent characteristics of effervescent, semi-killed and killed steels, requirements of the chemical composition, structure and surface finish, measures to be taken to yield an appropriate structure and sound surface free of defects. Graphs, diagrams, photograph, micrographs, table. 37 ref. (G4, ST)

260-G. Steel Rule Technique Cuts Costs of Metal-Blanking Dies. Henry Lefer. *Aviation Week,* v. 63, Sept. 12, 1955, p. 44-48, 51.

Technique uses plywood-supported high-carbon steel rules in conjunction with a steel male die in place of conventional steel plate dies. Photographs.
(G2, Al, Cu, ST, Ti)

261-G. Auto-Machining. P. Sorin. *Microtecnic (English Ed.),* v. 9, no. 3, 1955, p. 125-134.

Results of experimental observations on the importance of physical factors during the process of automatic machining. Diagrams, photographs, graphs, tables.
(G17, Al, Cu, ST)

262-G. Advances in Drilling Techniques Arising From Recent Research. D. F. Galloway. *Microtecnic (English Ed.),* v. 9, no. 3, 1955, p. 135-141.

Results of extensive researches carried out on different aspects of the performance of drills between 0.0135 in. and 2½ in. in diameter. Flow chart, diagram, graphs, photographs, tables. (G17)

263-G. Spark-Gap Tracer Control. *Product Engineering,* v. 26, 1955, p. 148-153.

Method of duplicating small parts of complex form and shape by use of tracer controls. Photographs, diagrams, graph. (G17)

264-G. (French.) **Industrial Applications of the Diamond.** F. Fromholt. *Métallurgie et la construction mécanique,* v. 87, no. 7, July 1955, p. 591 + 5 pages.

Properties of natural and artificial diamonds, and their uses in tools and grinding wheels. Micrographs, diagrams. (G18)

265-G. Machining Aluminum Honeycomb Without Aid of Filler Materials. G. R. Gordon. *Automotive Industries,* v. 113, Sept. 15, 1955, p. 55, 138.

Opens new field for use of honeycomb core fillers in manufacture of aircraft components. Photograph, diagram. (G17, Al)

266-G. The Grinding of Steel. XXV. Grinding and Finishing Machines. *Edgar Allen News,* v. 34, Sept. 1955, p. 203-204.

Operation of some grinding wheels. Photographs. (G18, ST)

267-G. The Floturning Process. *Machinery (London),* v. 87, Sept. 2, 1955, p. 577-562.

Akin to spinning, process requires a massive lathe with a flexible angular head and a rigid driven disk as the forming tool working against a mandrel. Photographs, diagrams. (G17, ST, Al)

268-G. Automatic Control of Machine Tools. R. W. Fenemore and C. R. Borley. *Research,* v. 8, Sept. 1955, p. 351-356.

For accurate and fast machining, the question of tool cutter wear must be fully investigated and reduced to a minimum, and the table positioning servomechanism needs to be accurate. Diagrams. 5 ref. (G17)

269-G. An Investigation Into the Use of Plastic Tools for Presswork With Particular Reference to the Aircraft Industry. Paul K. Digby, Walter J. Paul and J. V. Connolly. *Sheet Metal Industries,* v. 32, no. 341, Sept. 1955, p. 645-662.

Plastics facilitate easier and cheaper tool production than is practicable with zinc and, for the tools produced, reduced the necessary time cycle by about 80% with a corresponding reduction in man-hours required. Tables, diagrams, photograph, graphs. (G1, Al)

270-G. SRL Remote Underwater Cutoff Machine. G. J. Deily. Paper from "Fourth Annual Symposium on Hot Laboratories and Equipment". TID-5280. Office of Technical Services, U. S. Department of Commerce, p. 225-235.

For sectioning highly radio-active specimens, this machine cuts with both abrasive wheel and specimen submerged, washes down and disposes of waste by remote means, and has capacity to handle a specimen 30 in. long. Table, photographs. (G18)

271-G. (Czech.) **Development of a New Type of Sintered Carbide, S4, for Machining Under Difficult Conditions.** C. Agte and M. Petrdlik. *Strojirenstvi,* v. 5, no. 5, May 1955, p. 358-362.

Chemical composition of S4, properties of S group sintered carbides, compared with T and L series, experience in advantages of machining metal with S4 cutters. Tables, phase diagrams, micrograph, photograph. 26 ref. (G17, T6, C-n)

272-G. (Czech.) **Czechoslovakian Electro-Erosion Machining Apparatuses.** Z. Bilek. *Strojirenska vyroba,* v. 3, no. 6, June 1955, p. 247-250.

Design, performance and use in Czech and Soviet factories, advantages over "electrospark" machining. Provides easy machining process for sintered carbides and high strength steels. Photographs, tables. (G17)

273-G. (German.) **Electro-Erosion Machining of Metals.** Werner Ullmann. *Aluminium,* v. 31, no. 9, Sept. 1955, p. 433-436.

Increased use of high-strength special steels and cemented metal carbides for tools calls for economical method of machining; this technique is meant to solve problem. Diagram, photographs. (G17)

274-G. (Slovak.) **ESA Oxygen Electric Arc Cutting, With the Use of a Carbon Electrode.** Fr. Erdmann-Jesnitzer. *Zvaranie,* v. 4, no. 5, May 1955, p. 131-135.

Advantages of East German apparatus (e.g., after cutting, the surface of the material cut remained uncarbonized). Machine used carbon arc to preheat material to be cut. Photographs, micrograph, diagram. (G22)

275-G. Temperature Distribution at the Tool-Chip Interface in Metal Cutting. B. T. Chao and K. J. Trigger. *ASME, Transactions,* v. 77, Oct. 1955, p. 1107-1119; disc., p. 1119-1121.

A rapid, iterative method for computing distribution of temperature at the tool-chip interface. Calculation shows that the maximum temperature occurs at a point near the trailing edge of the contact when chips are produced at conventional feeds and speeds with sintered carbide tools. Photograph, graphs, diagrams, tables. 27 ref. (G17)

276-G. Cutter Design and Application for Face-Milling Cast Iron and Steel. O. W. Boston and W. W. Gilbert. *ASME, Transactions,* v. 77, Oct. 1955, p. 1123-1130; disc., p. 1130-1131.

Results of tests on a variety of metals with cutters of various materials, sizes and shapes. Results, relating to cutter design, are averaged for various grades of cast iron, tool materials, feed, depth, width of bar, number of teeth in the cutter and the cutting speed. General effects of each variable obtained from final tool shapes for steel and cast iron which are given for recommended practice. Diagrams, graphs, tables. (G17, CI, ST)

277-G. Take a Card for Machine Tool Control. D. B. Schneider. *Automation,* v. 2, Oct. 1955, p. 36-39.

Business machine cards work both positioning and tool movement. Photographs. (G17, A5)

278-G. The Iron-Oxygen Combustion Process. A Study Related to Oxygen Cutting. A. A. Wells. *British Welding Journal,* v. 2, Sept. 1955, p. 392-400.

Measurements of combustion rate between iron and oxygen compared with calculations that determine rate of diffusion of oxygen to combustion face through stagnant boundary layer of gaseous impurities. Tables, diagrams, graphs. 10 ref. (G22, N1, Fe)

279-G. Electro-Machining Methods for Metals. A. L. Livshits and V. Ya. Rassokhin. *Engineers' Digest,* v. 16, Sept. 1955, p. 429-432. (Translated from *Stanki i instrument,* v. 25, no. 11, Nov. 1954, p. 12-17; v. 26, no. 1, Jan. 1955, p. 8-12.)

Review of machining by electric spark, electric impulse, anode-mechanical, electric contact and electro-mechanical methods. (G17)

280-G. Thread and Form Rolling. Clifford T. Appleton. *Mechanical Engineering,* v. 77, Oct. 1955, p. 866-871.

Process and machines for producing threads of uniform quality. Diagrams, photographs, table. (G12, G11)

281-G. Metallurgy in Mass Production. L. A. Danse. *Metal Progress,* v. 68, Sept. 1955, p. 88-92.

Comments on heat treatment and forming problems in 1918; role of the metallurgist in present day metalworking operations. Photographs. (G general, J general)

282-G. A Technique for Machining Tungsten. R. Levi. *Philips Technical Review,* v. 17, Sept. 1955, p. 97-100.

Developed for dispenser-type cathodes, this method may prove valuable for other applications. Photographs, micrograph, table. 7 ref. (G17, W)

283-G. Cold Extrusion Is Shaping Up. John E. King. *Steel,* v. 137, Oct. 3, 1955, p. 70-71.

Best applications, press life, selection of raw materials and tool engineering. Photograph, table. (G5, CN)

284-G. The Fundamentals of Progressive Tooling. II. J. A. Grainger. *Steel Processing,* v. 41, Sept. 1955, p. 579-582, 597.

Uninterrupted feeding of stock across die face is considered. Diagrams, photographs. (G1)

285-G. **Heavy Surface Grinding. I.** John E. Hyler. *Western Machinery and Steel World,* v. 46, Sept. 1955, p. 86-89.

Given impetus by rapid development of alloy steels. Photographs. (To be continued.) (G18, AY)

286-G. **Machinability of Sintered Bronze.** W. A. Irvine. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 14-22; disc., p. 23-27.

Main problems at Maytag Co. were tool life and maintenance of dimensions on parts being machined. Photographs, micrographs, diagram, tables. (G17, Cu)

287-G. (Czech.) **Ways of Increasing the Efficiency of Oxygen Cutting.** L. Kulhanek. *Strojirenstvi,* v. 5, no. 3, Mar. 1955, p. 212-216.

New designs of cutting torches, technology of their manufacture, increasing economies in use of oxygen and acetylene. Photographs, tables, diagrams. (G22)

288-G. (Czech.) **New Ideas in the Theory and Design of Milling Heads.** K. Pechaty. *Strojirenstvi,* v. 5, no. 4, Apr. 1955, p. 276-281.

Factors limiting use of sintered carbides for milling, cause and prevention of self-induced vibrations, influence of cutter material on damping of vibrations. Graphs, diagrams, photographs. 4 ref. (G17)

289-G. (German.) **Development and Technical Aspect of One-Purpose Machine-Tools for Iron and Steel Works.** Hans G. Rohs. *Stahl und Eisen,* v. 75, no. 18, Sept. 8, 1955, p. 1162-1170.

Possibilities of increasing performance of machines used to process blooms and semifinished products such as roll turning lathes and roll grinding machines. Photographs, diagrams. 11 ref. (G17, ST)

290-G. (German.) **The Machinability of Free-Cutting Steel.** Herbert Müller. *Stahl und Eisen,* v. 75, no. 18, Sept. 8, 1955, p. 1171-1176.

Compilation of data taken from literature on appropriate chemical composition, melting and processing methods, heat treatment, machinability tests. Tables. 72 ref. (G17, ST)

291-G. (German.) **Machining Tests With Steadily Increasing Cutting Speeds.** Alexander Schepers. *Stahl und Eisen,* v. 75, no. 18, Sept. 8, 1955, 1176-1182.

Interpretation of results of short-time tests on billets made of open-hearth steels to determine effects of carbon, silicon, managanese and lead. Graphs, table. 11 ref. (G17)

292-G. **New Development in Flame Cutting.** *Welding and Metal Fabrication,* v. 23, Oct. 1955, p. 392-396.

Fully automatic machine uses photographic control method. Photographs, table. (G22)

293-G. (Czech.) **Evaluation of the Present State of Machining With Sintered Corundum.** F. Vintner and J. Preisler. *Strojirenstvi,* v. 5, no. 3, Mar. 1955, p. 199-203.

Effect of quality and cutting angles of disks on cutting power; recommendations based on Czech and Soviet plant practice; use of ceramic disks in discontinuous machining; face-milling of cast iron; durability of ceramic milling cutters and knives. Diagrams, graphs, table. 5 ref. (G18, G17, CI)

294-G. (Dutch.) **Considerations for the Machinability of Steel.** B. L. ten Horn. *Metalen,* v. 10, no. 17, Sept. 15, 1955, p. 357-363.

Various machinability tests for high-speed steels and hard metals. Graphs, diagrams. 6 ref. (G17, TS, EG-d)

295-G. (German.) **Metal Removal Machining of Aluminum Alloy by Means of Hard-Metal Tools.** J. Witthoff. *Technische Mitteilungen Krupp,* v. 13, no. 5, Sept. 1955, p. 110-117.

Review of hard metal cutting tools and tips, with consideration to particular working types and manufactured items. Cutting metal composition. Graphs, tables, diagrams, photographs. 9 ref. (G17, Al)

296-G. (German.) **Rollers of Hard Metal.** J. Hinnüber and H. D. Dietze. *Technische Mitteilungen Krupp,* v. 13, no. 5, Sept. 1955, p. 118-120.

Application and economies of hard-metal rollers, effect on the machined metal. Photographs, diagrams, table. (G11, G17, EG-d)

297-G. (Russian.) **Electrospark Machining of Metals.** B. R. Lazarenko and N. I. Lazarenko. *Elektrichestvo,* 1955, no. 8, Aug., p. 63-68.

Background of method since its discovery, types of electrosparking machines and their operational details in cutting, application of metallic coatings, surface hardening, machining. Photographs, micrograph, diagram. 8 ref. (G17)

298-G. (Russian.) **Industrial Production of Cylindrical Gears by Hot Rolling.** A. D. Kuz'min and M. V. Vasil'chikov. *Vestnik mashinostroniia,* v. 35, no. 9, Sept. 1955, p. 41-44.

Wear and strength tests show that the teeth of gears thus produced are superior to milled ones. Diagrams, photographs, table, graph. (G11, Q9, Q27, ST)

299-G. The Press Brake—as a Production Tool. V. Punching. L. F. Spencer. *Heating & Air Conditioning Contractor,* v. 47, Oct. 1955, p. 58 + 4 pages.

Pressure required, use of "stepped" punches, punch and die clearance, slug disposal. Photograph, table, diagrams. (G2, CN)

300-G. Automatic Control of Complete Machining Cycles. *Machinery Lloyd (Overseas Ed.),* v. 27, Oct. 8. 1955, p. 79-80.

All machine movements and auxiliary functions are controlled by magnetic tape program prepared electronically from numerical data, derived from drawings of parts. Photographs. (G17, S18)

301-G. Clad Steel Flame Cut Without Powder. *Metal-Working,* v. 11, Nov. 1955, p. 4-5.

Smooth, narrow kerf easily produced by modified technique. Photographs, table, diagram. (G22, ST)

302-G. Pinions Shaped and Sized Automatically. *Metal-Working,* v. 11, Nov. 1955, p. 6-7.

Cutter hone triples quantity of gears between sharpenings. Photographs, diagram. (G17)

303-G. Drawing Dies for Stainless Steels Require Modifications. XXVIII. Stanley R. Cope. *Metalworking Production,* v. 99, Oct. 7, 1955, p. 1714-1716.

Choice of suitable die materials is necessary to avoid scratches and score marks. Diagrams. (To be continued.) (G4, T5, Ni, SS)

304-G. Jet-Action Cutting. *Modern Metals,* v. 11, Oct. 1955, p. 40, 42.

New process rips through aluminum plate at up to 300 in. per min. with no ill effect on metal properties. Photographs, diagrams. (G22, Al)

305-G. Bend Forming Tapered Wing Plates for the First Multi-Jet Seaplane. J. C. Spurgeon. *Modern Metals,* v. 11, Oct. 1955, p. 68.

Bends are produced by 6-in. radius top die point; end-to-end taper of aluminum plates is produced by adjusting top die girder. Photographs. (G6, T24, Al)

306-G. The Blanking and Piercing of Thin Foil Stock. W. M. Halliday. *Sheet Metal Industries,* v. 32, no. 342, Oct. 1955, p. 741-744.

Stack blanking, storing and separating foil parts. (G2, Sn)

307-G. Transfer Presses—Some Aspects of Their Advantages and Use in the Sheet-Metal Industry. *Steel Processing,* v. 41, Oct. 1955, p. 643-646.

Use for components requiring a series of press operations, and where large quantities are required. Photographs, diagrams. (G1, CN)

308-G. How to Fabricate Plastic-Faced Dies. Walter A. Hockett. *Tool Engineer,* v. 35, Nov. 1955, p. 87-90.

Dies can be produced in less time and with lower cost, life is increased as much as ten times and faithfully fine details are formed in workpieces. Photographs. (G9)

309-G. Heavy Surface Grinding. II. John E. Hyler. *Western Macninery and Steel World,* v. 46, Oct. 1955, p. 84-87.

At each revolution of large-diameter chuck or work table, a workpiece travels beneath 2, 3, 4 or 5 wheels, each of which has a grinding task. Photographs. (To be continued.) (G18)

310-G. Grinding Titanium With Coated Abrasive Belts. Hugh N. Dyer. *Western Machinery and Steel World,* v. 46, Oct. 1955, p. 142.

Successful grinding depends on reducing wear by lowering temperature at grinding point and using fluids which form protective films over freshly cut surfaces. 2 ref. (G18, G21, Ti)

311-G. (French.) **The Formation of Ears in the Drawing of Aluminum Sheet.** Gustav Siebel. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 127-136; disc., p. 136-137.

Study of various factors influencing ear formation and research on condition favoring nearly isotropic behavior of sheets. Photograph, diagrams, graphs, table. 8 ref. (G4, Al)

312-G. (French.) **Anisotropy of Pure Aluminum Sheet—Earing in Deep-Drawing.** Guy Trapied. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 139-149; disc., p. 150.

New continuous casting process consists of spraying on ingot, below spray ring, water atomized by air under pressure; slower cooling assures sufficient isotropy to suppress ear formation during drawing. Diagrams, photographs. (G4, C5, Al)

313-G. Make the Most of Aluminum. *Automatic Machining,* v. 17, Nov. 1955, p. 31-35.

Problems in machining in automatic bar machines can be dissipated by proper tool geometry and correct speeds and feeds. Diagrams, tables. (To be continued.) (G17, Al)

314-G. Strengthening Steel Structures by Means of Prestressing. Rudolph Szilard, Jr. *Engineering Journal,* v. 38, Oct. 1955, p. 1379-1381.
Design equations. Technique should become widely used because of economical and other advantages. Diagrams, photographs. (G22, Al)

315-G. You Can Cut Aluminum Plate at Speeds up to 300 Inches a Minute. *Industry & Welding,* v. 28, Nov. 1955, p. 40 + 7 pages.
Application of a new inert-arc (Heliarc) process whose shield is an argon-hydrogen gas-shielded arc. Diagrams, photographs. (G22, Al)

316-G. Semiautomatic Line Speeds Aluminum Tank Production. John Sloan. *Iron Age,* v. 176, Nov. 3, 1955, p. 95-97.
Operations include forming, welding and machining. Photographs. (G general, K general, T26, Al)

317-G. Versatile Multiple Slide Equipment. W. G. Patton. *Iron Age,* v. 176, Nov. 3, 1955, p. 98-100.
Forming can be spread over as many as four dies to lengthen die life and simplify maintenance and repair. Photographs. (G1)

318-G. Nylon Rolls Prevent Scratches in Forming Prefinished Strip. K. G. Harms. *Iron Age,* v. 176, Nov. 3, 1955, p. 104-105.
Roll pairs of nylon and steel, set up for progressive contouring, will form prefinished, thin-gage stainless, brass and aluminum. Photographs, diagram.
(G11, Al, Cu, SS, ST)

319-G. Scientific Points of Comparison Between the Various Methods of Bending Sheet Metal. Otto Kienzle. *Microtecnic (English Ed.),* v. 9, no. 4, 1955, p. 177-184.
Considers work pieces which have to support external forces in addition to internal residual stresses after being bent over straight edges. Diagrams, graphs, photographs. (G6)

320-G. Sound Drilling Practice. E. Van Emden. *Microtecnic (English Ed.)* v. 9, no. 4, 1955, p. 185-198.
Investigation of dimensions and other physical properties and their relationship to cutting ability; study of proper speeds and feeds, grinding methods, coolant applications, general workshop conditions. Photographs, tables, diagram. (G17)

321-G. Unique Spar-Cap Milling, Bending, Contouring at Douglas. C. F. Wallace. *Western Metals,* v. 10, Oct. 1955, p. 49-51.
Operation also involves a unique chip disposal method, heat treatment for age hardening, sandblasting. Photographs. (G17, G6)

322-G. (French.) **Superfinishing With the Cutting Tool.** Jean-Jacques Desherault. *Revue de l'aluminium,* v. 32, no. 223, July-Aug. 1955, p. 701-712.
Obtained by direct machining with a tungsten carbide cutting tool a surface state of a very high standard, three times better than by superfinishing techniques, six times better than with diamond finishing, is shown by a Brush surface analyzer. Graphs, diagrams, tables, photographs. (G17, EG-a)

323-G. (Book.) **The New American Machinist's Handbook.** Rupert le Grand, editor. Sections individually paged. 1955. McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y.
A comprehensive and up-to-date guide to machining, metal-forming, and assembly methods; materials; metal finishing; inspection; fastening devices; tool engineering and drafting practice; machine-tool standards; and power transmission equipment. (G general, K general, L general, S general)

SECTION H

POWDER METALLURGY

1-H. Applicability of Powder Metallurgy to Problems of High Temperature Materials. G. M. Ault and G. C. Deutsch. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1214-1226. disc., p. 1227-1230.

Review of attempts to solve high-temperature problems in use of wrought and sintered superalloys, aluminum, molybdenum and cermets. Tables, micrographs, graphs, photographs, diagrams. 47 ref. (H general, SG-h, Co, Al, Mo, C-n)

2-H. Powdered Metal Parts Find Increasing Automotive Applications. D. B. Martin. *Machinery,* v. 61, Nov. 1954, p. 192-197.

Powder processes offer purer, more uniform materials at lower costs. Photographs, diagrams. (H general, T21)

3-H. Pressing Parts From Powdered Metals—A New Concept. Byron B. Belden. *Mechanical Engineering,* v. 76, Nov. 1954, p. 891-896.

Advance in press design permits use of simpler die sets in pressing thin-wall bushings and compacting and pressing flanged parts. Diagrams, photograph. (H14)

4-H. Iron Rotating Bands. John D. Dale. *Ordnance,* v. 39, Nov.-Dec. 1954, p. 498-501.

Production, properties and specifications for sintered iron projectile parts. Tables. (H general, T2, Fe)

5-H. Powder Metallurgy Permits Good Control Over Combined Properties. F. R. Farnham. *Iron Age,* v. 174, Nov. 25, 1954, p. 102-105.

Advantages for use as electrical contacts. Production techniques. Photographs, diagrams, table. 1 ref. (H general, Ag, Ni, Cu, Mo, W)

6-H. Specially Bonded Silicon Carbide. W. L. Wroten. *Materials & Methods,* v. 40, Nov. 1954, p. 83-85.

Silicon nitride as bonding agent gives improved high-temperature strength, closer size tolerances and high abrasion and corrosion resistance. Table, graph, photographs. (H12, C-n)

7-H. Sintering. Carl G. Paulson. *Metal Progress,* v. 66, Nov. 1954, p. 122-123, 176.

Bonding of individual particles during the sintering operation is dependent not only on temperature but also on the proper furnace atmosphere for that temperature. Although the volatile constituents of the binding material are driven off at relatively low temperatures, the chemical reaction of the residue with certain gases rids the compact of these materials to permit the particles to establish a bond with each other. (H15)

8-H. (French.) **Some Aspects of Powder Metallurgy.** Robert Girschig. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 665-673.

Review of theoretical consequences of differences between cast and sintered metals. Industrial applications. Diagrams, micrograph, graph, photograph. (H general)

9-H. Contribution to the Theory and Practice of Pressing Powdered Materials. C. Ballhausen. *Henry Brutcher, Altadena, Calif., Translation no.* 3393. 21 p. (From *Archiv für das Eisenhüttenwesen,* v. 22, nos. 5-6, 1951, p. 185-196.)

Previously abstracted from original. See item 63-H, 1951. (H14)

10-H. (German.) **Highly Heat-Resistant Sintered Materials.** Richard Kieffer. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning,* v. 25, no. 6, 1954. p. 264-280.

Review of developments in the field of powder metallurgy and cermets. Manufacture and properties of high-temperature alloys, carbides, borides, silicides and oxides. Graphs, tables, diagrams, photographs. 42 ref. (H general)

11-H. **Measurement of Lubricant Thickness on Powder-Metallurgy Dies.** N. P. Pinto. *Lubrication Engineering,* v. 10, Nov.-Dec. 1954, p. 336-339.

Use of air gage to check lubrication of die bores produces readings accurate and reproducible within 0.00005 in. Also useful for analyzing causes of early die failure. Diagrams, graph. 1 ref. (H14)

12-H. **Infiltration With Copper Extends Range of Usefulness of Powdered Iron Gears and Cams.** *Precision Metal Molding,* v. 12, Dec. 1954, p. 41-42.

Copper infiltration increases strength and wear resistance. Photograph.
(H16, Q23, Q9, Cu, Fe)

13-H. (German.) **Sintered Aluminum Powder.** R. Irmann. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 10, Oct. 1954, p. 327-334.

Reasons why mechanical and physical properties of cold compressed, sintered and extruded aluminum powder and its alloys differ from pure Al and Al alloys. Diagrams, micrographs, tables, graphs, photographs. 27 ref.
(H15, H11, P general, Q general, Al)

14-H. (Portuguese.) **Study of the Influence of the Shape of the Piece on the Sintering Behavior of Powdered Mixtures of Copper and Tin.** Vicente Chiaverini and Carlos de Revoredo Barros. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 34, Jan. 1954, p. 11-22.

Test methods and experimental data. Diagrams, tables. 3 ref.
(H15, Cu, Sn)

15-H. (Portuguese.) **Industrial Use of Steel Powder.** Georges Smirnow. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 34, Jan. 1954, p. 43-55.

General review of applications and production equipment. Micrographs, graphs, tables.
(H general, ST)

16-H. (Russian.) **Investigation of Sintering of Pressed Metallic Powders Subjected to Hydrostatic Pressure.** Ia. E. Geguzin and B. Ia. Sukharevskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 9, Sept. 1954, p. 1613-1621.

Effects of various pressures and temperatures on shrinkage and flow of copper and nickel powders. Graphs. 9 ref. (H14, H15, Cu, Ni)

17-H. **Progress With Metal Powders and Powder Metallurgy.** H. W. Greenwood. *Engineer,* v. 198, Dec. 3, 1954, p. 780-781.

Review of the advancements in the field over the past seven years.
(H general)

18-H. **Copper Sidesteps the Crucible.** John D. Shaw. *Steel,* v. 135, Dec. 20, 1954, p. 76-77.

Production of strip from powder recovered from copper scrap using the roll bonding process. Diagram, photograph, table. (H14, Cu)

19-H. (Czech.) **Contribution to the Pressing of Metal Powders.** Jiri Vacek. *Hutnické Listy,* v. 9, no. 8, Aug. 1954, p. 456-462.

Determination of pressure distributions in copper, cobalt and molybdenum briquettes. Tables, graphs, photographs. 12 ref.
(H14, Cu, Co, Mo)

20-H. (Czech.) **Sintered Materials of the System Tungsten-Cobalt for Contacts Produced by Infiltration.** Julius Chmelicek. *Hutnické Listy,* v. 9, no. 10, Oct. 1954, p. 602-609.

Infiltration of a porous tungsten skeleton by molten copper; effects of processing variables. Diagrams, tables, graphs, micrographs, photograph. 20 ref. (H16, W, Cu)

21-H. (German and French.) **Aluminum Powder and Paste.** W. Hess. *Aluminium Suisse,* v. 4, no. 6, Nov. 1954, p. 183-190.

Principal uses and production techniques. Photographs.
(H general, Al)

22-H. (Pamphlet.) **Vibratory Compacting of Metal and Ceramic Powders.** Report PB 111435. 47 p. 1953. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00.

Significant advantages of low-frequency vibration over hydrostatic packing of alumina-chromium and titanium carbide-nickel cermets.
(H14, Cr, Ti, C-n, Ni)

23-H. **Sintered Aluminium Powder.** R. Irmann. *Engineers' Digest,* v. 15, Dec. 1954, p. 514-516. (From *Schweizer Archiv,* v. 20, no. 10, Oct. 1954, p. 327-334.)

Previously abstracted from original. See item 13-H, 1955.
(H15, H11, P general, Q general, Al)

24-H. **Friction and Lubrication in Powder Metallurgy.** Henry H. Hausner and Irving Sheinhartz. *Metal*

Powder Association, Proceedings, v. 1, 1954, p. 6-26; disc., p. 26-27.

Evaluation of friction and lubrication variables in the production of powder metal parts. Diagram, graphs, tables, photograph, micrographs. 26 ref. (H13)

25-H. The Non-Destructive Testing of Sintered Brass Parts. Julian Rossnick. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 39-41; disc., p. 42-43.

Use of inductance bridge to determine crush strength of sintered parts. Photographs, diagrams, graph. (H11, Cu)

26-H. Powder Metallurgy in the Automotive Industry. Joseph Geschelin. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 44-49; disc., p. 50.

Compositions and processing variations for typical applications. Tables. (H general, T21)

27-H. Aircraft Applications for Powder Metallurgy. William H. Woodward. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 51-55; disc., p. 55.

Savings possible by use of powdered metals in experimental and production parts for aircraft. Graphs, diagrams, tables. (H general, T24)

28-H. Powder Metallurgy Versus Other Precision Forming Methods. Mathias M. Check. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 56-58.

Advantages of powder metallurgy for production of precision parts. (H general)

29-H. The Manufacture of Sheet Metals From Metal Powder. W. D. Jones. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 60-65; disc., p. 66-67.

Continuous powder fabrication methods and possible applications. Photographs. (H14)

30-H. Semi-Formed Drawing Stock by Powder Metallurgy. Robert Steinitz and Frank I. Zaleski. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 72-76; disc., p. 76.

Advantages and properties of preformed iron powder compacts for deep drawing of cartridge cases. Photographs, tables. (H14, G4, Fe)

31-H. Note on the Relationship Between Brittleness and Microstructure of Cermets. P. Schwarzkopf and W. Leszynski. *Powder Metallurgy Bulletin,* v. 7, Dec. 1954, p. 19-21.

Possibilities of producing a shock-resistant material. 2 ref. (H general, Q23, M27)

32-H. The Friability Test as a Method of Evaluating Sinter Cake. I. Sheinhartz and H. M. McCullough. *Powder Metallurgy Bulletin,* v. 7, Dec. 1954, p. 22-24.

Detection of chemical impurities and inclusions before final processing of metal powders. Table, graphs. (H15)

33-H. (Czech.) **Direct Carbidization of Tungsten Trioxide.** Curt Agte and Josef Hruska. *Hutnické Listy,* v. 9, no. 11, Nov. 1954, p. 642-646.

Economic importance and conditions for direct production of tungsten carbide. Tables, graphs. 12 ref. (H10, WC)

34-H. (German.) **Effect of Particle Size on the Grain Growth of Sintered Metal.** Kazuhiko Ogawa, Gentaro Matsumura and Daizo Okubo. *Monatshefte für Chemie,* v. 85, no. 6, 1954, p. 1281-1286.

Review of literature and experimental data with powders ranging from 0.5 to 43 m. Tables, micrographs, graph. 18 ref. (H11, N3)

35-H. Metal Powders for Engineering Purposes: A Review. W. D. Jones. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 1-7 + 1 plate.

Manufacture and relative properties of powders. Micrographs. 21 ref. (H10, H11)

36-H. The Grinding of Metal Powders. G. F. Hüttig and H. Sales. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 8-10.

Effects of metal properties and grinding variables on grinding results; mechanical properties of sintered steel were improved by decreasing grain size of the powder. Graphs.

(H10, Q general, Cu, Zn, Al, Fe, W)

37-H. The Production and Fabrication of Tantalum Powder. R. Titterington and A. G. Simpson. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 11-18 + 1 plate.

Commercial methods; sintering; cold working of compacts; heat treatment. Tables, photograph, graphs, micrographs. 10 ref. (H general, Ta)

38-H. The Powder Metallurgy of Zirconium. F. G. Cox and G. L. Miller. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 19-24.

Production methods, compacting and applications. Handling precautions. Tables, diagrams, graph. 12 ref. (H general, Zr)

39-H. Powders for Magnetic Applications. G. R. Polgreen. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 24-29.

Production of iron and iron alloy powders; advantages of powders for permanent magnets. Table, graphs, diagram. (H10, SG-n, Fe)

40-H. Recent Developments in Testing Metal Powders. G. R. Bell. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 30-37.

Comparison of test methods; evaluation of inherent errors. 107 ref. (H general)

41-H. Application of Particle Size Analysis to the Quality Control of Metal Powders. V. T. Morgan. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 38-43.

Apparatus for estimating particle size distribution. Effects of subsieve particle sizes on properties of copper, tin and iron-copper powders. Diagram, tables, graphs, photograph. (H11, S12, Cu, Sn, Fe)

42-H. Determination of the Gas Contents of Materials of Powder-Metallurgy Practice. H. A. Sloman. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, p. 44-49.

Equipment and techniques. Analyses of various powders. Table. 16 ref. (H11)

43-H. The Mechanism of Infiltration. Paul Schwarzkopf. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 1-4 + 1 plate.

Defines two stages of infiltration; structural changes during liquid-phase sintering. Micrographs. 10 ref. (H16, H15)

44-H. The Sintering Mechanism of Pure Metals, Including 'Activated Sintering'. M. Eudier. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 5-9 + 2 plates.

Effects of sintering variables; accelerated method. Graphs, diagram, micrographs, photograph. 7 ref. (H15)

45-H. The Variation of Thermoelectric Force During Sintering. Günther Ritzau. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 9-13.

Isothermal change of thermo-e.m.f. of 50-50 copper-nickel mixture indicates progress of the diffusion process. Graphs, table. 3 ref. (H15, N1, P15, Cu, Ni)

46-H. The Designation of Powders and Sintered Materials by Means of the Properties of the Pore Volume. K. Torkar and G. F. Hüttig. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 14-17.

Use of gas diffusion and gas permeability to evaluate structures and sintering behavior. Table, micrograph. 14 ref. (H11, H15)

47-H. Pore-Size Distribution and Permeability of Porous Metal Materials. P. R. Marshall. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 17-26.

Use of capillary rise of a liquid to evaluate sintered compacts. Diagrams, graphs, tables. 11 ref. (H11)

48-H. Filter Elements by Powder Metallurgy. V. T. Morgan. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 27-35 + 2 plates.

Characteristics of compacts produced from spherical powders. Effects of interparticle welding on mechanical and physical properties. Tables, photographs, graphs. 10 ref. (H14, Q general, P general)

49-H. Relationships Between the Properties of Iron Powders and Powder Compacts. F. V. Lenel, H. D. Ambs and E. O. Lomerson, Jr. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 36-42 + 2 plates.

Data from laboratory-produced powders. Effects of processing variables. Graphs, tables, micrographs. 10 ref. (H11, Fe)

50-H. Pressing Characteristics of Air-Atomized Copper Powder. A. Duffield and P. Grootenhuis. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 42-47.

Effects of particle size and size distribution on initial filling density and repacking. Diagrams, tables, graphs. 16 ref. (H14, Cu)

51-H. Grain Growth During Sintering. Henry H. Hausner. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 48-58 + 4 plates.

Principles; variables influencing recrystallization; behavior of zirconium and beryllium. Diagram, micrographs, graphs, tables. 27 ref. (H15, N3, N5, Zr, Be)

52-H. The Hot Compacting of Metal Powders. J. Williams. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 58-70.

Dilatometric measurements of copper, iron, aluminum, thorium, zirconium, silver, magnesium and beryllium show a two-stage process of densification. Graphs, diagram, tables. 19 ref.
(H14, Cu, Al, Th, Zr, Ag, Mg, Be)

53-H. The Continuous Compacting of Metal Powders. P. E. Evans and G. C. Smith. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 77-82 + 3 plates.

Compacting of copper powder by direct rolling to produce a continuous strip. Effects of rolling and sintering variables on mechanical properties. Diagrams, graphs, micrographs. 16 ref.
(H14, Q general, Cu)

54-H. Effect of Small Boron Contents on the Properties of Compacts Prepared by Vacuum Sintering. F. Frehn and W. Hotop. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 83-89 + 4 plates.

Advantages of vacuum sintering; effects of boron on density and magnetic properties of iron and Alnico. Micrographs, tables. 10 ref.
(H15, H11, P16, Fe, Al, Ni, Co)

55-H. Sintering Furnace Atmospheres. L. D. Brownlee, R. Edwards and T. Raine. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group II, p. 89-94.

Types of atmospheres; control methods; types of furnaces. Tables, diagrams, photograph. (H15)

56-H. Some Developments in Sintered Structural Parts. C. J. Leadbeater. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 1-11 + 4 plates.

American and European developments in production and design of parts from alloy-infiltrated iron, alloy steels, brass and aluminum alloys. Tables, graphs, photographs, micrograph. 24 ref.
(H general, Fe, AY, SS, Cu, Al)

57-H. Experiments on the Production of High-Strength Material and Parts by Powder Metallurgy. L. Harrison and S. Marton. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 11-19 + 1 plate.

Advantages and disadvantages of three methods of production. Tables, graphs, micrographs. 7 ref.
(H general)

58-H. Sintered Nickel Steel and Notes on Other Sintered Alloys. S. C. Wilsdon and P. J. Ridout. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 20-26 + 2 plates.

Production techniques; effects of alloy additions and sintering variables on mechanical properties. Tables, photographs, graphs, micrographs. (H15, Q general, AY)

59-H. Solid Stainless-Steel Compacts From 18-8 Austenitic Powders. B. Sugarman. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 27-31 + 3 plates.

Standard 18-8 powder produced the strongest compacts; effects of compacting load on mechanical properties. Tables, graphs, diagram, micrographs. 6 ref.
(H14, Q general)

60-H. Porous Stainless Steel. D. A. Oliver, S. C. Wilsdon, P. R. Marshall, B. Sugarman, G. Collins and C. T. J. Jessop. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 32-46.

Production of 18-8 powder by electrochemical disintegration; applications of compacts; mechanical properties. Graphs, micrograph, tables, photographs. 14 ref.
(H10, Q general, SS)

61-H. The Porosity and Air Permeability of Sintered Iron and Iron-Copper. C. J. Leadbeater and S. Turner. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 47-52.

Effects of compacting pressures, copper content and particle size on permeability coefficients. Diagram, graphs. 5 ref. (H14, H11, Fe, Cu)

62-H. Low-Expansion Nickel-Iron Alloys Prepared by Powder Metallurgy. V. Thomas and D. J. Jones. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 52-55 + 1 plate.

Use of powder metal techniques to study expansion characteristics of alloys. Photograph, table, graphs, micrographs. 3 ref.
(H general, P11, Fe, Ni)

63-H. Application of Powder Metallurgy to the Production of High-Permeability Magnetic Alloy Strip. E. V. Walker, D. K. Worn and R. E. S. Walters. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 56-60 + 1 plate.

Comparison with magnetic properties of conventional strip; effects of production variables on perme-

ability. Tables, graph, micrographs. (H general, P16, Fe, Ni, Mo, Cu)

64-H. Production of Sintered Copper-Lead Bearing Material. W. E. Duckworth. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 65-70 + 2 plates.

Advantages of sintering over casting. Importance of surface forces on sintering. Photographs, diagrams, graphs, micrographs. 15 ref. (H15, Cu, Pb)

65-H. Properties and Testing of Sintered Copper-Lead Bearing Materials. P. G. Forrester and W. E. Duckworth. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 71-73 + 1 plate.

Control procedure for obtaining desired properties. Table, diagram, graph, micrographs. 6 ref. (H general, Q general, Cu, Pb)

66-H. Fluon-Impregnated Self-Lubricating Bearing Materials. A. Blainey. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 74-87 + 1 plate.

Preparation and testing of true oilless bearings. Diagrams, tables, graphs, micrographs. (H16, Cu, Fe, Sn, SS)

67-H. Preparation of High-Modulus Aluminum Alloys by Powder Metallurgy. N. F. Macdonald and C. E. Ransley. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 94-100 + 1 plate.

Production, properties and limitations of compacts containing a second phase with high modulus. Tables, graphs, micrographs. 6 ref. (H general,Q general, Al)

68-H. Powder Metallurgy of Magnesium. D. J. Brown. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 100-104.

Types of powder and production methods; extrusion methods; typical mechanical properties. Tables. 11 ref. (H11, Q general, Mg)

69-H. Developments in High-Density Alloys. E. C. Green, D. J. Jones and W. R. Pitkin. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 1-4 + 2 plates.

Manufacturing procedures for tungsten-nickel-copper and tungsten-nickel-iron alloys; mechanical properties. Tables, micrographs. (H general, Q general, W, Ni, Cu, Fe)

70-H. The High-Temperature Strength of Some Co—Ni—Fe—Cr—Base Materials Made by Powder Metallurgy. G. T. Harris and H. C. Child. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 5-12.

Effects of composition on creep strength at 850° C. Tables, graphs. 5 ref. (H general, Q23, Cr, Ni, Fe, Cr)

71-H. Preparation and Properties of Titanium and Titanium Alloys Prepared by Sintering. D. A. Robins, W. R. Pitkin and I. Jenkins. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 12-19 + 1 plate.

Preparation of chromium and molybdenum-containing alloys; mechanical properties. Tables, diagrams, graphs, micrographs. 11 ref. (H general, Q general, Ti, Cr, Mo)

72-H. Sintered Titanium Carbide Alloys. E. M. Trent and A. Carter. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 20-24 + 1 plate.

Bonding of titanium carbide with nickel and cobalt; creep and oxidation resistance; methods of manufacture. Graphs, tables, micrographs. 14 ref. (H general, Q3, R2, TiC)

73-H. The Testing of Ceramal Materials With Particular Reference to a Simple Titanium-Carbide—Cobalt Material. T. W. Penrice and D. H. Shute. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 25-29 + 1 plate.

Effects of composition and binder segregation on mechanical properties. Diagrams, table, photograph, graphs, micrographs. 4 ref. (H general, Q general, Co, TiC)

74-H. The Creep Strength of Titanium Carbide Base Materials. G. T. Harris, H. C. Child and J. F. Howard. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 30-40.

Heat resisting alloys are better binders than nickel or cobalt; effects of other carbide additions. Diagram, graphs, tables. 13 ref. (H12, Q23, Ni, Co, TiC)

75-H. Silicides of the Transition Metals of the 4th, 5th, and 6th Groups of the Periodic Table. R. Kieffer and F. Benesovsky. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 40-49 + 2 plates.

Preparation; equilibrium diagrams of binary and ternary systems; scaling behavior of several silicides. Tables, graphs, photographs. 47

ref. (H general, M24, Si, Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W)

76-H. Effect of Carbon Content on the Properties of Tungsten-Carbide-Cobalt Hard Metal. L. D. Brownlee, R. Edwards and T. Raine. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 50-52 + 1 plate.

Structural and mechanical property changes with variation of carbon content from the theoretical requirement. Graph, table, diagram, micrographs, photograph. 3 ref. (H11, M general, Q general, Co, WC)

77-H. Chromium Carbide in Hard-Metal Alloys. J. Hinnüber and O. Rüdiger. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 53-58 + 1 plate.

Effects of chromium carbide additions on mechanical and corrosion properties of cermets. Tables, graphs, micrographs. 18 ref. (H12, Q general, R general, Cr, C-n)

78-H. Metal-Ceramic Bodies. A. E. S. White, F. K. Earp, T. H. Blakeley and J. Walker. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 59-62.

Selection of metals and ceramics for specific property combinations. Micrograph, tables, graphs. (H general)

79-H. Development of Metal-Ceramics From Metal-Oxide Systems. J. R. Baxter and A. L. Roberts. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 63-72 + 5 plates.

Requirements for satisfactory combinations; behavior of nickel and cobalt alloys with sintered alumina; silver-cuprous oxide-alumina constitutes a "model system". Tables, graph, micrographs, photographs. 26 ref. (H12, Ni, Co, Ag)

80-H. The Rupture-Strength of Some Metal-Bonded Refractory Oxides. G. T. Harris and H. C. Child. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group IV, p. 73-78 + 1 plate.

Test data on several refractory oxides bonded with cobalt, nickel, chromium, iron or their alloys. Diagram, graph, tables, micrographs. 9 ref. (H general, Q23, Co, Ni, Cr, Fe)

81-H. Influence of Additives in the Production of High Coercivity Ultra-Fine Iron Powder. Edward W. Stewart, George P. Conard, II, and Joseph F. Libsch. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 152-157.

Effects of several additives during hydrogen reduction of ferrous formate on sintering and magnetic properties of the powder. Tables, graphs. 19 ref. (H10, P16, Fe)

82-H. Resistance Sintering Under Pressure. F. V. Lenel. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 158-167.

Equipment; required characteristics of powder and compacts; temperature distributions; gas reactions; potential commercial applications of process. Photographs, diagram, graphs, tables, micrographs. 7 ref. (H15)

83-H. (English.) **The Interaction of Various Reactions During Sintering.** Henry H. Hausner. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 1051-1059; disc., p. 1060.

Mechanisms of particle bonding in zirconium and iron powders. Graph, micrographs, tables. 8 ref. (H15, Zr, Fe)

84-H. (German.) **High-Temperature Materials Produced by Powder Metallurgy.** Paul Schwarzkopf. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 1027-1040; disc., p. 1040-1041.

Study of materials showing satisfactory mechanical strength and scaling resistance at temperatures above 800° C. Graphs, photographs. 18 ref. (H general, Q23)

85-H. (German.) **The Adhesive Capacity of Powders.** E. Cremer. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 1043-1048; disc., p. 1048-1049.

Theory of slippage of powders; application to experiments with magnesite; development of a method for grain-size measurements. Graphs, table. 6 ref. (H11, M27)

86-H. (German.) **Pores in Sintered Bodies in the Bragg Soap-Bubble Model.** Josef Heuberger. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskaps-

akademien and Chalmers Tekniska Högskola, p. 1061-1064; disc., p. 1064.

Application of the Bragg experiments to observing the shrinking of pores on sintered bodies. Photographs. (H15)

87-H. (German.) **Magnetic Investigation of Homogenization of an Alloy During Sintering.** Werner Köster. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 1069-1076; disc., p. 1076-1077.

Theory of the magnetic analysis of the sintering process; determination of the concentration distribution curve from the magnetization-temperature curves; sintering isotherms for nickel, copper and zinc. Graphs. 5 ref.
(H15, P16, Ni, Cu, Zn)

88-H. (German.) **Carbide Formation During the Sintering of Complex Iron-Carbon Systems.** Emma-Maria Onitsch-Modl. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 1079-1092; disc., p. 1092.

Investigation on powder mixtures of iron, carbon, chromium, tungsten, molybdenum and vanadium. Individual stages of carbide formation depending upon the temperature. Micrographs, graph, diagrams, table. 10 ref. (H15, Fe, Cr, W, Mo, V)

89-H. (Book.) **Powder Metallurgy 1954.** 312 p. The Iron and Steel Institute, 4 Grosvenor Gardens, London SW1, England. £3.5.0.

Contains 50 papers covering manufacture, properties, and testing of powders; principles and control of compacting and sintering; manufacture and properties of structural engineering components; and powder metallurgy of high-melting-point materials. Individual papers are separately abstracted. (H general)

90-H. How to Produce Hard, Tough Steel Parts From Powder Metal. J. W. Young. *Iron Age,* v. 175, Feb. 3, 1955, p. 119-122.

Manufacturing methods, properties of parts. Tables, diagrams, graphs, photographs.
(H general, ST)

91-H. Progress in Powder Metallurgy. H. W. Greenwood. *Metallurgia,* v. 51, no. 303, Jan. 1955, p. 33-35.

Important developments in production, sintering and infiltration techniques. 14 ref. (H general)

92-H. Porous Metal Components. Potentialities of Sintered Metal Powders for Special Uses. *Metal Treatment and Drop Forging,* v. 22, Jan. 1955, p. 3-8.

Applications in filtering of chemicals through stainless steel, de-icing of aircraft and cooling of gas-turbine blades. Photographs, diagram. 6 ref. (H general)

93-H. Investigation of Process of Density Increase of Single-Phase Metal-Powder Compacts. III. Relationships Determining the Volume Changes of Metal-Powder Compacts During Sintering. V. A. Ivensen. *Henry Brutcher Translation no.* 2987, 21 p. Henry Brutcher, Altadena, Calif. (Abridged from *Zhurnal Tekhnicheskoi Fiziki,* v. 18, no. 10, 1948, p. 1290-1305.)

Constancy of relative decrease in volume of voids of copper and cobalt powders during sintering within complete or limited range and of green densities of initial compact. Graphs, table. 4 ref.
(H15, Cu, Co)

94-H. Analysis of Continuity of One Phase in a Powder Mixture of Two Phases. F. Forscher. *Franklin Institute, Journal,* v. 259, Feb. 1955, p. 107-114.

Theoretical examination of conditions necessary to permit continuity. Diagrams, graphs. 6 ref. (H12)

95-H. An Evaluation of Dissociated Ammonia and Hydrogen Atmospheres for Sintering Stainless Steel. Herbert S. Kalish and Edmund N. Mazza. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 304-310.

Nitrogen from dissociated ammonia enters the metal and causes embrittlement, increased hardness and slower sintering. Tables, micrographs, photograph. 17 ref.
(H15, SS)

96-H. (English.) **Natures of Activation Energies in Self-Diffusion and in Sintering and of Sublimation Energy of Copper.** Mitsuru Sato. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 5, Oct. 1954, p. 458-461.

Studies of mechanism of sintering action of copper powder. Table. 9 ref. (H15, Ni, Cu)

97-H. (French.) **Dilatometric Study of Sintering Carbonyl Iron in the Isothermal Condition.** Georges Cizeron and Paul Lacombe. *Comptes rendus,* v. 240, no. 4, Jan. 24, 1955, p. 427-429.

Study at different sintering temperatures of the variation of density as a function of time using a Chevenard dilatometer. Graphs. 3 ref. (H15, Fe)

98-H. (German.) **Studies on Grain Formation and Structure of Powders Produced by Dispersion of Molten Metals.** E. Pelzel. *Metall,* v. 9, nos. 3-4, Feb. 1955, p. 81-88.

Effects of alloys on the condition of powders produced by spraying molten metal with compressed air through a nozzle. Micrographs, graphs, tables. 11 ref. (H10, M27, Fe, ST, Al, Cu, Pb, Sn, Zn, Ni, Mn)

99-H. (German.) **Sintered Machine Parts.** Gerhard Zapf. *VDI Zeitschrift,* v. 97, no. 4, Feb. 1, 1955, p. 89-96.

Equipment and methods; factors which influence the properties of sintered parts; effects of heat treating; molding practices; production costs. Photographs, diagrams, tables, graphs. 24 ref. (H general)

100-H. (Russian.) **Obtaining Nickel Powders by Electrolysis.** B. V. Drozdov. *Zhurnal Prikladnoi Khimii,* v. 28, no. 1, Jan. 1955, p. 45-51.

Experimental methods and theoretical discussion. Tables. 13 ref. (H10, Ni)

101-H. P.T.F.E.-Impregnated Dry Bearings. D. C. Mitchell and A. E. Burke. *Engineers' Digest,* v. 16, Feb. 1955, p. 53-58.

Methods of impregnating bronze bearings with polytetrafluorethylene. Testing procedures, performance of bearing. Tables, graphs, photographs, diagram, micrographs. 9 ref. (H16, Cu)

102-H. (German.) **Problems of Structure in Hard-Alloy Phases.** H. Nowotny. *Planseebericht für Pulvermetallurgie,* v. 1, no. 2, Feb. 1953, p. 43-60.

Relationship between lattice structure and hardness of different compounds; consideration of Hägg's theory on intercalation lattices. Diagrams, graphs. 33 ref. (H11, M26)

103-H. (German.) **Bibliography.** *Planseeberichte für Pulvermetallurgie,* v. 1, no. 2, Feb. 1953, p. 72-77.

Divided into various branches of powder metallurgy technology. (H general)

104-H. (Pamphlet.) **Metal Powder Association, Proceedings of Tenth Annual Meeting. v. I-II.** 116 p. 1954. Metal Powder Association, 420 Lexington Ave., New York 17, N. Y.

Consists of nine papers on general powder metallurgy and five papers on properties and applications of powdered iron cores in electronic equipment. Papers are abstracted individually. (H general, P15)

105-H. Resistance Sintering of Powder Compacts. *Metal Industry,* v. 86, Mar. 4, 1955, p. 176.

Equipment and operating procedures. 1 ref. (H15)

106-H. Now: High Strength Alloy Steel Powder Metal Parts. *Product Engineering,* v. 26, Mar. 1955, p. 133-138.

Production of products from prealloyed steel powders. Properties and design factors. Photographs, micrographs, tables, graphs. (H12, H general, AY)

107-H. Improved Tungsten Carbide-Cobalt Compacts by Electric-Resistance Sintering. Perry G. Cotter, J. A. Kohn and R. A. Potter. *U. S. Bureau of Mines, Report of Investigations* 5100, Jan. 1955, 19 p.

Effects of high temperatures and pressures on mechanical properties. Photographs, diagram, tables, graphs. (H15, C-n)

108-H. Hot Pressing Technique for Metal Carbides and a Semiautomatic Hot Press. J. Rietveld. *Henry Brtucher Translation No.* 3356, 7 p. (From *Metall,* v. 6, nos. 3-4, 1952, p. 81-82.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 40-H, 1953. (H14, C-n)

109-H. Metal-Ceramic Interactions. V. Note on Reactions of Metals With Titanium Carbide and Titanium Nitride. W. D. Kingery and F. A. Halden. *American Ceramic Society Bulletin,* v. 34, Apr. 1955, p. 117-119.

Interfaces and powder mixtures studied microscopically and with X-ray techniques. Diagram, tables. 11 ref. (H12, M26, Mo, Nb, Ni, Fe, Si, Ti, Zn)

110-H. Porosity and Permeability Changes During the Sintering of Copper Powder. G. Arthur. *Institute of Metals, Journal,* v. 83, Mar. 1955, p. 329-336.

Measurements on copper powders sintered in hydrogen for periods up to 100 hr. at 1000° C. Diagrams, graphs, tables. 14 ref. (H15, Cu)

111-H. Progress Report on Cermets. Frank W. Glaser. *Metal Progress,* v. 67, Apr. 1955, p. 77-82, 138.

Properties and applications of nickel aluminides, titanium carbide with metal binder and borides of

chromium-molybdenum. Micrograph, tables, graphs, photographs. (H general)

112-H. Production of Copper Strip. H. Franszen. *Metal Industry,* v. 86, Mar. 25, 1955, p. 227-229. (From *Zeitschrift für Metallkunde,* v. 45, no. 6, June 1954, p. 328-331.)

Previously abstracted from original. See item 122-H, 1954. (H general, Cu)

113-H. New Trends in Powder Metallurgy. Herbert B. Michaelson. *Materials & Methods,* v. 41, Apr. 1955, p. 92-97.

Developments in the use of metal powders for rolled sheet, special structures and flame spraying. Photographs, tables. 11 ref. (H general)

114-H. Porous Metal Sheet. John B. Campbell. *Materials & Methods,* v. 41, Apr. 1955, p. 98-101.

Controlled permeability plus resistance to heat and corrosion make metal powder sheet materials useful for special applications. Photographs, diagrams, table, micrograph, graphs. (H general)

115-H. (Czech.) **Sintered Frictional Materials.** W. Cegielski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, no. 1, 1955, p. 17-23.

Survey of powdered frictional materials, technology of their production, application and various types of design solutions. Tables, diagrams, micrographs, photograph. 7 ref. (H general)

116-H. (German.) **Influence of Alloy Conditions on the Physical Properties and Recrystallization of Vacuum Sintered Molybdenum.** Egon Pipitz and Richard Kieffer. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 187-194.

Investigation of the influence of beryllium, titanium, zirconium, vanadium, thorium, columbium, tantalum, chromium, tungsten and manganese on the recrystallization process and physical properties. Tables, graphs, photographs. 15 ref. (H general, N5, P general, Mo)

117-H. (Italian.) **Sintering of Brass.** Neri Corsini. *Metallurgia italiana,* v. 47, no. 2, Feb. 1955; *Atti notizie* (AIM), v. 10, no. 2, Feb. 1955, p. 49-52; disc., p. 52.

Technical characteristics of sintered brass powders; economic aspects. Table, graphs, micrographs. 8 ref. (H15, Cu)

118-H. (Russian.) **Investigation of Local Temperature at Cathode During Electrolytic Deposition of Metallic Powders.** D. N. Gritsan and A. M. Bulgakova. *Doklady Akademii Nauk SSSR,* v. 100, no. 6, Feb. 21, 1955, p. 1111-1114.

Relation of maximum value of temperature differences to current densities of different cadmium sulfate concentrations. Graphs, table. 5 ref. (H10, Cd)

119-H. SAP Retains Properties After High Temperature Exposure. Roland Irmann. *Iron Age,* v. 175, Apr. 28, 1955, p. 104-106.

Ability of sintered aluminum powder to retain high mechanical properties after continued exposure to high temperature suggests many interesting applications. Graphs, tables. (H11, Al)

120-H. Rolling 18-8 Stainless Steel Powder Into Strip. Samuel Storchheim, John Nylin and Bernard Sprissler. *Sylvania Technologist,* v. 8, Apr. 1955, p. 42-44.

Results of investigation indicate possibility of producing strips possessing high density, high tensile strength, good ductility and corrosion resistance, and relatively random crystallographic orientation. Tables, graphs. 7 ref. (H14, SS)

121-H. Sintering of Powders and Related Processes. A. S. Berezhnoi. *Henry Brutcher Translation No.* 2889, 25 p. (From *Ogneupory,* v. 13, no. 6, 1948, p. 256-266.) Henry Brutcher, Altadena, Calif.

Classification of sintering processes; causes of growth of grains during sintering; types of distortions found in crystal lattice; five successive stages of "dry" sintering. Graphs. 22 ref. (H15)

122-H. Study of the Production of (Secondary) Cobalt and Tungsten-Carbide Powders. H. Rutkowski, B. Razumowski and I. Glinska. *Henry Brutcher Translation No.* 3487, 13 p. (From *Prace Glownego Instytutu Metalurgii,* v. 4, no. 4, 1952, p. 153-160.) Henry Brutcher, Altadena, Calif.

Cemented carbides prepared from cobalt powder obtained electrolytically, by reduction of cobalt formate, and from tungsten carbide recovered from scrap. Data on density and hardness. Tables, graphs, micrographs. 9 ref. (H10, Co, W)

123-H. (German.) **Crystal Structure Investigation and Microhardness Determination of High-Tungsten Sintered Alloys of the Tungsten-Chromium-Nickel System.** H. Bückle. *Planseeberichte für Pulvermetallurgie,* v. 3, no. 1, Feb. 1955, p. 2-16.

Influence of different compositions and sintering temperature on

the structure and physical properties. Phase diagrams, micrographs, graphs. 10 ref.
(H15, M26, Q29, W, Cr, Ni)

124-H. (Russian.) **Use of Thermobattery to Measure the Temperature Effect at the Cathode During the Electrolytic Deposition of Metal Powders.** D. N. Gritsan, A. M. Bulgakova and N. N. Bagrov. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 2, Feb. 1955, p. 345-349.

Apparatus utilizes a differential thermocouple; temperature effect not dependent on size of cathode surface. Graphs, tables. 4 ref. (H10)

125-H. (Polish.) **Obtaining and Sintering of Molybdenum Silicide.** W. Rutkowski. *Hutnik,* v. 22, no. 1, 1955; *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa,* v. 6, no. 1, 1955, p. 1-3.

Microstructure and hot-gas corrosion of molybdenum silicide sintered at 1400° C. Comparisons with other alloys. Micrographs, photographs. (H15, Mo, Si)

126-H. Powder Metallurgy. *American Society for Naval Engineers, Journal,* v. 67, May 1955, p. 521-532.

Manufacturing, properties and testing of iron, ferrous alloy, and nonferrous metal powders; principles and control of compacting and sintering; manufacturing and properties of structural engineering components; powder metallurgy of high-melting point materials. Table, photograph. (H general)

127-H. The Sintering, Fabrication, and Properties of Thorium. M. D. Smith and R. W. K. Honeycombe. *Institute of Metals, Journal,* v. 83, May 1955, p. 421-426.

Systematic data on the sintering and working of relatively pure thorium as the first steps in a program of work on the properties of thorium-base alloys. Graphs, table. 15 ref. (H15, Th)

128-H. Metal Powder Components for Motor Vehicles. D. B. Martin. *Machinery (London),* v. 86, May 6, 1955, p. 975-979.

Parts can be made to close dimensional tolerances by molding the powders in accurate dies and controlling the shapes of the compacts during heat treatment. Diagrams, photographs.
(H14, J general)

129-H. Powder Metallurgy for Atomic Engineers. (Digest of "The Role of Powder Metallurgy in the Design of Nuclear Power Reactors", by Henry H. Hausner and Milton C. Kells; presented before the April 1955 meeting of the American Society of Mechanical Engineers.) *Metal Progress,* v. 67, June 1955, p. 167-168, 170.

The way structural units, made by powder metallurgical methods, may be expected to differ from those made by conventional methods when exposed to conditions within a power reactor. (H general, T25)

130-H. (Book.) **Symposium on Testing Metal Powders and Metal Powder Products.** ASTM Special Technical Publication No. 140. 87 p. 1953. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Applications and improved compositions, testing methods, and particle size distribution. (H general)

131-H. Mechanism of Material Transport During Sintering. Raymond F. Walker. *American Ceramic Society, Journal,* v. 38, June 1955, p. 187-197.

Evaporation-condensation mechanism; surface and volume diffusion; macroscopic flow mechanisms; viscous and plastic flow; significance of sintering atmosphere. Graphs, micrographs, tables, diagrams. 36 ref. (H15)

132-H. Sintering Powdered Metals. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 27, May 21, 1955, p. 85-86.

Effects of surface tension, volume and porosity. Diagram. (H15)

133-H. Nickel Alloys Made by Powder Metallurgy Techniques. *Metallurgia,* v. 51, no. 307, May 1955, p. 215-217.

Closer control over composition possible in the production of nickel and nickel alloys by powder metallurgy methods results in improvement in properties, particularly valuable in the electronic field. Tables. 1 ref. (H general, Ni)

134-H. Finish Compressor Blades to 6-8 Micro-Inches. *Precision Metal Molding,* v. 13, June 1955, p. 59-62.

Processes in producing a sintered compressor blade, including pressing, heat treating, grinding, cleaning, polishing and plating. Photographs. (H general, Fe, Cu)

135-H. Magnetic Powder Cores. C. Gordon Smith. Paper from "Magnetic Alloys and Ferrites". George Newnes. p. 159-170.

Development, applications and permeability of iron powders, iron-aluminum-silicon alloys, nickel-iron and related alloy powders. Graph, photograph, table. 18 ref.
(H11, P16, Fe, Ni, Al)

136-H. (Russian.) **New Method of Determining the Grain Size and Unit Surface Area of Powders Used in Powder Metallurgy.** B. V. Deriagin, N. N. Zakhavaeva and M. V. Talaev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 881-886.

Deriagin method and apparatus (based on filtration of rarefied air through the powder). Equations given. Photographs, graph, table. 11 ref. (H11, Cu, Fe, Al, Pb)

137-H. Titanium-Carbide-Base Cermets for High-Temperature Service. K. Pfaffinger, H. Blumenthal and F. W. Glaser. *American Society for Testing Materials, Preprint No.* 94b, 1955, 10 p.

Development, physical properties and production procedures of titanium-carbide-base cermets containing 25 to 65% of nickel-chromium or nickel-cobalt-chromium binder. Tables, graphs, photographs. 7 ref. (H general, SG-h, Ti)

138-H. Titanium-Carbide Products Produced by the Infiltration Technique. Leonard P. Skolnick and Claus G. Goetzel. *American Society for Testing Materials, Preprint No.* 94g, 1955, 7 p.

Technique permits use of low pressures for compacting the powders, making possible direct pressing of complex shapes. Infiltration *per se* permits the production of void-free bodies of remarkably true shape and close dimensional tolerances, and in many aspects is strikingly similar to precision casting. Table, photograph, graphs, micrographs. 5 ref. (H16, Ti)

139-H. Titanium Powder Metallurgy. H. W. Dodds. *Metal Industry,* v. 86, June 10, 1955, p. 489-490.

Fabrication of parts by press formed compacts. Graphs, table, diagram, photographs. (H14, Ti)

140-H. Methods and Techniques for the Determination of Specific Surface by Gas Adsorption. A. S. Joy. *Vacuum,* v. 3, July 1953, p. 254-278.

Review of experimental procedures for determination of specific surfaces and relative surface areas by measuring volume of gas adsorbed on the surface of the solid. Tables, graphs, diagrams. 87 ref. (H11)

141-H. Infiltration of Porous Tungsten With Copper and Silver. (Part III of "Sintered Electric Contact Materials".) W. Rutkowski and S. Stolarz. *Henry Brutcher Translation No.* 3481, 20 p. (From *Prace Glownego Instytutu Metalurgii,* v. 4, no. 1, 1952, p. 67-81.) Henry Brutcher, Altadena, Calif.

Numerical data on influence of various factors, such as particle size of tungsten powders, compacting pressure, sintering temperature, and infiltration time, upon density of tungsten skeletons before and after infiltration; porosity of tungsten skeletons; amount of copper, etc. infiltrated; hardness; electrical conductivity; loss of weight on arcing. Tables, micrographs. 5 ref. (H16, W, Ag, Cu)

142-H. (Polish.) **Fayalite Sinter Compacts.** Zdzislaw Kotas. *Wiadomosci Hutnicze,* v. 11, no. 2, Feb. 1955, p. 43-45.

Fayalite sinter compact is defined as an iron powder product in which, during sintering, there appears a ferrous orthosilicate ("fayalite") of the composition $2FeO \cdot SiO_2$ which acts as a bonding agent. Although more fuel is required for sintering this material, its advantages include strength and resistance to weathering. Graphs. 3 ref. (H15, Fe)

143-H. (Russian.) **Influence of the Electrolyte Concentration on the Temperature Effect at the Cathode During the Electrolytic Deposition of Metallic Powders.** D. N. Gritsan and A. M. Bulgakova. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 4, Apr. 1955, p. 649-652.

Emperical equations are developed for electrolytic production of cadmium, copper, and zinc powders. Graphs, table. 6 ref. (H10, Cd, Cu, Zn)

144-H. Small Volume Production of Metal Powder Parts. B. I. Horton. *Materials & Methods,* v. 42, July 1955, p. 92-93.

Type of parts produced and the savings that have resulted from using powder metal parts. Photographs. (H general)

145-H. High Strength Steel Parts by New Powder Metallurgy Process. John W. Young. *Metal Progress,* v. 68, July 1955, p. 110-113.

Manufacture of steel parts from metal powders with high density and a combination of hardness, strength and ductility approaching that of wrought material of the same alloy and carbon content. Graphs, diagrams, micrographs. (H general, ST)

146-H. (German.) **Rosin-Rammler's Distribution of Grain Size in Ground Powders.** R. Brenner and A. Vidmajer. *Metall,* v. 9, no. 9-10, May 1955, p. 395-403.

Determination of distribution maxima from experimentally determined distribution and grain-size parameters. Graphs. 4 ref. (H11)

147-H. (Polish.) **Investigations of Metal Powder Production.** W. Rutkowski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 141-147.

Electrolytic and chemical methods of preparing iron, copper, tin, cobalt and nickel powders. Analysis of physical and chemical properties to determine suitability for producing articles. Tables, graphs, micrographs, diagram. 19 ref. (H10, H11, Fe, Cu, Sn, Co, Ni)

148-H. Properties and Uses of Sintered Aluminium. R. Irmann. *Metal Treatment and Drop Forging,* v. 22, June 1955, p. 245-250.

Properties and potentialities of sintered aluminum powder, possible uses. Micrographs, graphs, tables, photographs, diagrams. 22 ref. (H general, Al)

149-H. Fabrication of Beryllium by Powder Metallurgy. Wallace W. Beaver. Paper from "The Metal Beryllium". American Society for Metals, p. 152-201.

Production, consolidation and fabrication of powders and properties of resulting products. Graphs, diagrams, tables, micrographs, photographs. 20 ref. (H general, Be)

150-H. Research and Development in Beryllium Powder Metallurgy. Henry H. Hausner and Norman P. Pinto. Paper from "The Metal Beryllium". American Society for Metals, p. 202-240.

Theory, room temperature compacting, mechanical and thermal treatment of compacts, cold press sintering and pressing at elevated temperatures. Graphs, tables, micrographs. 19 ref. (H general, Be)

151-H. Refractory Compounds and Cermets of Beryllium. Wallace W. Beaver. Paper from "The Metal Beryllium". American Society for Metals, p. 570-598.

Preparation, fabrication and properties of oxides, carbides and nitrides of beryllium. Methods of preparing cermets containing oxides, carbides and nitrides, intermetallic compounds, comparison of refractory compounds and cermets of beryllium. Tables, photograph, graph, micrographs. 52 ref. (H general, Be)

152-H. (English.) **On the Phenomenological Theory of the Fine Exfoliating Disintegration.** Muneyuki Date. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 2, Apr. 1955, p. 210-228.

Phenomenological calculation of the distribution function of numerous particles which are in the process of fine exfoliating disintegration. Graphs, tables, diagrams. 10 ref. (H10)

153-H. (German.) **Change in Dimension of Iron-Copper Sintered Alloys.** E. Pelzel. *Metall,* v. 9, nos. 13-14, July 1955, p. 565-569.

Possible causes of shrinkage and growth, selection of iron powder and copper or copper alloy powder, weight losses and shrinkage, mechanical properties of finished products. Tables, graphs, micrograph. 15 ref. (H15, Cu, Fe)

154-H. Some Studies of Al-Cu and Al-Zr Solid State Bonding. Samuel Storchheim. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Aug. 1955, p. 891-894.

Studied as a function of temperature, pressure and time at pressure, it is shown that good bonds were obtainable with copper, while excellent bonds were attained with zirconium. With this system, it is possible to develop bond strengths between the two metals which are greater than aluminum itself. Diagram, graphs, micrographs, photographs. 1 ref. (H14, N1, Al, Cu, Zr)

155-H. Production of Zirconium Diboride From Zirconia and Boron Carbide. Charles T. Baroch and T. E. Evans. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Aug. 1955, p. 908-911.

Techniques of production, design of graphite resistance furnace. Diagrams, tables. 13 ref. (H10)

156-H. Applications of Powder Metallurgy. *Metal Progress,* v. 68, Aug. 1, 1955, p. 97-99.

Highlights from five papers presented at the Western Metal Congress in March 1955. Application of carbides, sintered aluminum powder, structural components, high-temperature brazing. (H general)

157-H. New Presses for Metal-Powder Products. S. L. Zlotnikov and L. G. Brodskii. *Henry Brutcher Translation No.* 3451, 9 p. (From *Vestnik Mashinostroeniya,* v. 34, no. 7, 1954, p. 18-22.) Henry Brutcher, Altadena, Calif.

Three types of automatic press for compacting metal powders and buffering systems to control compacting pressure and prevent overloading of presses owing to varia-

tions in the nature of the material being pressed. Table, diagrams, graphs, photographs. (H14)

158-H. (French.) **Modern Methods for Hard Alloys Production.** R. Bernard. *Metallurgia italiana,* v. 47, no. no. 6, June 1955, p. 245-250.

Manufacture of 94% tungsten carbide, 6% cobalt alloy and development of modern alloys with abrasion, cratering, and shock-resistant properties. Tables, graphs, micrographs. (H10, H11, SG-j, m)

159-H. Precision Parts Sintered in Gas Fired Furnace. Robert O. Borden. *Industrial Heating,* v. 22, Aug. 1955, p. 1576 + 5 pages.

Equipment and procedures for sintering bronze bushings. Diagrams, photographs. (H15, Cu)

160-H. Powder Metallurgy—Its Role in the Design of Nuclear-Power Reactors. H. H. Hausner and M. C. Kells. *Mechanical Engineering,* v. 77, Aug. 1955, p. 665-669.

Material problems, applications of metal-powder components. Diagram, graphs, photograph. 10 ref. (H general, T25)

161-H. Europe Goes Ahead in Iron-Powder Metallurgy. Sven I. Hulthén. *Metalworking Production,* v. 99, Aug. 19, 1955, p. 1449-1454.

Postwar progress; different powders compared. Tables, graphs, photograph. 6 ref. (To be continued.) (H general, Fe)

162-H. Caster Wheels—Cast Iron or Powdered Iron? Keith McElwain. *Precision Metal Molding,* v. 13, Sept. 1955, p. 63-64, 106.

Use of powder metallurgy as a method for producing concentric, self lubricating, tough, wear-resistant wheels. Photographs, tables. (H general, CI, Fe)

163-H. Investigation of the Sintering Mechanism of the System Copper-Nickel by Means of Ferro-Magnetic Suspensions. G. F. Hüttig, K. Torkar and H. H. Weitzer. *Powder Metallurgy Bulletin,* v. 7, Aug. 1955, p. 48-52.

Studies of sintered bundles of fine wires. Micrographs. 7 ref. (H15, Cu, Ni)

164-H. The Rolling of Strip From Metal Powders. P. E. Evans and G. C. Smith. *Sheet Metal Industries,* v. 32, no. 340, Aug. 1955, p. 589-592.

Development of the rolling of powders, size limit of strip, sintering, mechanical and heat treatment, directional properties and potentialities of the method. Diagram. 23 ref. (H14)

165-H. Fabrication of Air-Cooled Turbine Blades by Powder Metallurgy. R. W. A. Buswell. *Metal Treatment and Drop Forging,* v. 22, Aug. 1955, p. 325-328.

Method for making gas-turbine rotor blades and nozzle vanes with a multiplicity of small diameter air-cooling holes extending through their entire length. Photographs, diagrams, tables. (H general, T25)

166-H. (Russian.) **The Use of Tagged Atoms in the Investigation of the Mixing of Metallic Powders.** V. P. Eliutin and A. K. Natanson. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 820-824.

Effects of various mixing treatments on the homogeneity of iron or other powder mixtures. Graphs, tables. (H12, S19, Fe)

167-H. Powder Metallurgy of Thorium. G. A. Meerson. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/635, July 1955, 12 p. (Translated from the Russian.)

Deals with calcium reduction of thoria; pressing and sintering of powder. Graphs, tables. (H general, Th)

168-H. Brass-Powder Structural Parts in Product Engineering—An Evaluation. G. L. Werley. *Mechanical Engineering,* v. 77, Sept. 1955, p. 762-765.

Consideration for pressing and sintering, specific design and physical and mechanical properties in proposed applications. Photographs, diagram, tables. (H general, T general, Cu)

169-H. Properties of Metal-Powder Products Obtained by Extrusion. A. S. Fialkov and Ya. S. Umanskii. *Henry Brutcher Translation No.* 3571, 8 p. (From *Doklady Akademii Nauk SSSR,* v. 96, no. 6, 1954, p. 1213-1216.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 126-H, 1954. (H14, Q general)

170-H. (French.) **Properties of Sintered Aluminum Semi-Products.** Jean Hérenguel and Jacques Boghen. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 341-346.

Factors which effect the properties are the basic powder, conditions of sintering and deformation after sintering. Graphs, table, photograph, micrographs. 4 ref. (H general, Q general, Al)

171-H. (French.) **Sintered Aluminum With High Heat Resistance.** Roland

Irmann. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 347-357; disc., p. 357-358.

Characteristics of powders used for obtaining SAP sintered products, processing of the powder, static mechanical properties, creep strength and endurance limit under fatigue stress, oxide content and physical and chemical properties, sintered aluminum alloys. Micrographs, graphs, photographs, diagrams, table. 22 ref.
(H15, Q general, Al)

172-H. (Russian.) **Laws of Phase Transformations During the Sintering of Metal-Ceramic Copper-Lead Compositions.** T. N. Znatokova and V. I. Likhtman. *Doklady akademii nauk SSSR,* v. 103, no. 3, July 21, 1955, p. 445-447.

Copper-lead system is seen as one containing a liquid phase over a rather broad temperature range during sintering. Heat treatments and corresponding phases, microstructure and microhardness studied. Micrographs. 3 ref.
(H15, M27, Cu, Pb)

173-H. Manufacture of Metallic Powders and Pastes. G. M. Babcock and F. B. Rethwisch. *American Paint Journal,* v. 40, Oct. 17, 1955, p. 68 + 11 pages.

Stamping, ball milling, precipitation, electrodeposition, miscellaneous production methods. (H10)

174-H. Powder Metallurgy — Its Rapid Development. Henry H. Hausner. *Metal Progress,* v. 68, Sept. 1955, p. 101-105.

Unique advantages of powder metallurgy, formerly considered only for mass production of small parts, have opened a diverse and growing number of applications for the process. Diagrams, micrographs, graphs.
(H general)

175-H. Prealloyed Steel Powders and Their Applications. A. H. Grobe and G. A. Roberts. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 28-40; disc., p. 40-42

Describes rotating water jet disintegration process and reported properties of high-strength low-alloy and stainless steel powders. Diagram, tables, graphs, micrograph, photographs. (H10, H11, ST SS)

176-H. Carbide Tooling for Pressing Metal Powders. T. A. Wilson. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. I., p. 44-50; disc., 50-51.

Explains ingredients and making of carbide dies; shows examples. Diagrams. (H14, SG-j, W, Ti, Ta)

177-H. The Effect of Copper Additions on Iron Powder. Some Aspects of the Sintering of Iron-Copper Mixtures. P. Ulf Gummeson and Lennart Forss. *Proceedings.* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 56-64; disc., p. 64-65.

Special consideration given to copper addition below solubility limit of copper in iron at sintering temperature. Graphs. 13 ref.
(H15, Cu, Fe)

178-H. Iron Powder Metallurgy in Europe. Present and Future. Sven I. Hulthen. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 67-101; disc., p. 101-103.

History, manufacture and use, market, raw materials, treatment of powders, pressing and tooling, sintering and a glimpse into future. Tables, photographs, graphs, micrographs, diagrams. 10 ref.
(H general, Fe)

179-H. A Powder Producer Views Titanium Powder Metallurgy. J. F. Sachse. *Proccedings,* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 104-106; disc. p. 106-107.

Advantageous properties such as weight, strength and corrosion resistance are enhanced because powder, per pound, costs much less than structural shapes per pound.
(H general, Ti)

180-H. A Fabricator Views Titanium Powder Metallurgy. H. W. Dodds. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 108-111; disc., p. 111-113.

Outlines hot pressing and press forming processes. Diagrams, photographs, table, graphs. (H14, Ti)

181-H. Method of Specifying Iron Powder Cores. Charles E. Cherry, Jr. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. II, p. 116-121.

Theory behind tools that the Association has made available to specifiers. Diagram.
(H general, Ti, Fe)

182-H. Quality of Magnetic Powder Cores for Military Applications. E. Both and D. Elders. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. II, p. 122-136; disc., p. 136.

Evaluation program developed procedures for exposing core materials

to environmental stresses. Photographs, tables, graphs. 2 ref. (H general, Ti, Fe)

183-H. The Various Iron Powders Used in Electronic Cores. J. A. Roberts and G. O. Altmann. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. II, p. 141-147; disc., p. 148-149.

History, methods of manufacture, properties and core applications. Photographs, diagram. 19 ref. (H general, Ti, Fe)

184-H. (Czech.) **New Information About Sinterability.** Jiri Vacek. *Hutnické listy,* v. 10, no. 8, Aug. 1955, p. 469-479.

Small metallic additions to molybdenum, copper, cobalt, nickel and tungsten powders avoid thick order lattice irregularities and improve sinterability. Graphs, micrographs, tables. 15 ref. (H15, Mi, Cu, Co, Ni, W)

185-H. (French.) **Physical Investigation Methods Used in Powder Metallurgy—Their Application to Manufacture Control.** M. R. Bernard. *Metallurgia italiana,* v. 47, no. 8, Aug. 1955, p. 367-376.

Control methods based on optical metallography, electronic microscopy, measure of specific surfaces, X-ray diffraction, magnetic measures, electron diffraction, exo-electrons, and radioactive tracers. Graphs, photographs, micrographs. 16 ref. (H11, M21, M22, M23)

186-H. (German.) **New Immersion-Impregnating Process and the Properties of Sintered Iron-Brass Compound Alloys.** E. Pelzel. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 783-790.

New method by which powder-metal specimens are immersed under vacuum, after regular sintering, into a bath of liquefied alloy which has a melting temperature lower than that of the pressed part. Parts thus produced attain a tensile strength of 60 kg. per sq.mm. and above. Graphs, diagram, table, photographs, micrographs. 14 ref. (H16, Fe, Cu)

187-H. (Book.) **Eleventh Annual Meeting of Metal Powder Association,** *Proceedings.* v. I. General Session on Powder Metallurgy. v. 2. Electronic Core Session. 199 p. 1955. Metal Powder Assoc., 420 Lexington Ave., New York 17, N. Y.

Covers such specific metals as bronze, steel, copper, iron, titanium; and military applications in electronic equipment. (H general, ST, Cu, Fe, Ti)

188-H. Rolled Metal Powder Sheet. Lincoln T. Work, John D. Shaw and Walter V. Knopp. *Metal Progress,* v. 68, Oct. 1955, p. 115-116.

Good quality copper strip is being produced from roll-bonded copper powder. The powder is obtained by leaching low-grade copper-bearing scrap which cannot be remelted into ingot of good quality. Micrograph, tables. (H10, H14, Cu)

189-H. How Dimensions and Properties Are Affected by Adding Copper to Iron Powder Compacts. I. P. Ulf Gummeson and Lennart Forss. *Precision Metal Molding,* v. 13, Oct. 1955, p. 55-57, 92.

Report on changes in dimensions and physical properties. Graphs. (To be continued.) (H12, Cu, Fe)

190-H. (German.) **A Note on Sintering Zinc Powder.** Friedrich Erdmann-Jesnitzer and Peter Rack. *Metallurgie,* v. 5, no. 6, June 1955, p. 184-196.

Methods of improving creep behavior considered. Tables, graphs, micrographs, diagram, photographs. 23 ref. (H15, Q3, Zn)

191-H. (Polish.) **Powder Metallurgy Research in Czechoslovakia.** E. Bryjak. *Hutnik,* v. 22, nos. 7-8, July-Aug. 1955, p. 278-286.

Survey of developments, including sintering techniques, factors affecting sinterability, effect of additions, hardness and other characteristics of tungsten, cobalt and other sinter products. Tables, graphs. 9 ref. (H general, W, Co, Fe, Cu)

192-H. Hot Pressing Improves Powder Metal. *Metal-Working,* v. 11, Nov. 1955, p. 8-9.

Shrinkage allowance and sintering of carbides unnecessary. Photographs. (H14)

193-H. (Spanish.) **Present Ideas Concerning the Phenomenon of Sintering.** Antonio Garcia Verduch. *Instituto del hierro y del acero,* v. 8, no. 36, Apr.-June 1955, p. 136-148.

Influence of stoichiometric deviations on the rate of sintering, intergranular union, interaction of particles before sintering, pressing and gases occluded in pores. Graphs, diagrams. 22 ref. (H15)

194-H. How Dimensions and Properties Are Affected by Adding Copper to Iron Powder Compacts. II. P. Ulf Gummeson and Lennart Forss. *Precision Metal Molding,* v. 13, Nov. 1955, p. 44-45, 83-84.

Separate consideration of factors causing growth and shrinkage; spe-

cial interest given where copper is below the solubility limit of copper in iron at sintering temperature, shows that dimensional changes are closely related to the particle characteristics of the powder and duration of the liquid phase. Graphs. 12 ref. (H12, H11, P10, Fe, Cu)

195-H. (Czech.) **Effect of Carbon on the Quality of Sintered Carbides of the Tungsten Carbide-Cobalt System.** Miroslav Petrdlik and Vladimir Dufek. *Hutnické listy,* v. 10, no. 9, Sept. 1955, p. 528-535.

When testing sinterability with 2.6 and 10% cobalt, the best hardness, specific gravity and bending strength are obtained when carbon content is near the stoichiometric value. Tables, graphs, photographs, micrographs. 8 ref. (H15, H11, C-n, Co)

SECTION J

HEAT TREATMENT

1-J. Automatic Gas Carburizing of Automotive Gears. R. J. Peters. *Industrial Heating,* v. 21, Oct. 1954, p 1938-1940 + 5 pages.

A means for increasing demands for automotive transmissions of relatively constant size but with increasingly greater strength and torque-absorption ability. Photographs, graph, table, diagram. 3 ref (J28, AY)

2-J. How to Reduce Heat Treating Costs When Using Ammonia. Paul E. Peacock, Jr. *Industrial Heating,* v. 21, Oct. 1954, p. 1952-1954, 1956, 1958.

Economics of an installation for the bright annealing of stainless steel wire. Photographs. (To be continued.) (J23, SS)

3-J. How Austenitizing Conditions Affect Medium Alloy Steels. I-II. A. R. Troiano and R. F. Hehemann. *Iron Age,* v. 174, Nov. 11, 1954, p. 124-126; Nov. 18, 1954, p. 151-153.

Ms temperature can be raised 100° F. in medium alloy steels, thus reducing residual stresses and retained austenite. Graphs, tables, micrographs. 6 ref.
(J22, N8, Q25, AY)

4-J. Theory of Gas Atmospheres. A. G. Hotchkiss. *Metal Progress,* v. 66, Nov. 1954, p. 81-86.

Brief consideration of the fundamental scientific principles governing the reactions between hot metal and hot gases. Table, photographs, graphs. (J2)

5-J. Exothermic Atmospheres—Their Generation and Application. W. H. Boyd. *Metal Progress,* v. 66, Nov. 1954, p. 86-89.

The earliest and simplest of the atmosphere generators, the exothermic type, has widest application for heat treatment of constructional alloy and carbon steels. When dried to dew points around −40° F. by solid desiccants, this atmosphere is especially reliable in continuous furnaces which must have entrances and exits open at all times. Graph, diagram, photograph. (J2, ST)

6-J. Endothermic Atmosphere. Ralph J. Perrine. *Metal Progress,* v. 66, Nov. 1954, p. 89-93.

Temperature variation within the catalytic mass and other factors affecting the composition of the prepared gas and its stability after entering the heat treatment furnace. Diagram, tables, graphs. (J2)

7-J. Dry Nitrogen as a Base for Prepared Atmospheres. Donald Beggs. *Metal Progress,* v. 66, Nov. 1954, p. 94-98.

Very dry atmospheres containing substantially nothing but nitrogen and hydrogen (except perhaps a little carbon monoxide on occasion) have proven very useful for scale-free heating, carrier gas, inert atmosphere and purging explosive mixtures. Methods of manufacture and commercial equipment. Diagrams, photographs. (J2)

8-J. Dissociated Ammonia. M. Robert Ogle. *Metal Progress,* v. 66, Nov. 1954, p. 99-101.

A mixture of three parts hydrogen and one part nitrogen, dry—containing about 0.005% moisture by volume—is readily made in an inexpensive catalytic dissociator for liquid ammonia and is useful for bright heat treatment of stainless and high-nickel alloys, for reducing oxides or decarburizing, or for a carrier gas for special purposes. Graph, diagram, photograph. (J2)

9-J. Atmosphere Analysis and Control. Wayne L. Besselman. *Metal Progress,* v. 66, Nov. 1954, p. 102-105.

New equipment is now available for automatic and continuous analysis of furnace atmospheres, notably

absorption of infra-red radiation by CO_2, CO, CH_4 and NH_3 (separately), the magnetic oxygen analyzer, and the use of thermal conductivity for hydrogen. Photographs.
(J2, S11, S18)

10-J. Elements of Gas Carburizing. Walter H. Holcroft. *Metal Progress,* v. 66, Nov. 1954, p. 106-109.

Modern gas carburizing requires a tight furnace, including proper entrance and exit locks, adequate flow of atmosphere of correct composition, which can be approximately predicted, and time and temperature cycle proper for the desired surface carbon and hardenable depth. Graphs. (J28, J2, ST)

11-J. Equilibrium Relationships for Dew Point Control. Norbert K. Koebel. *Metal Progress,* v. 66, Nov. 1954, p. 110-114.

While equilibrium relationships between constituents of prepared atmospheres are valuable for theoretical, research and developmental studies, heat treating operations in thoroughly reacted endothermic gas are much more adequately controlled by keeping the dew point in the furnace steadily at a correct value. Graphs, table. (J2)

12-J. Dew Point Control in Practice. O. E. Cullen. *Metal Progress,* v. 66, Nov. 1954, p. 114-118.

Since analysis of moisture in furnace gas is so much quicker and more accurate than CO_2 analysis, and improved (even automatic) equipment is available, the trend is toward furnace control by dew point when carburized or heat treated work is specified closely as to surface carbon or carbon penetration. Graphs, diagram. (J2)

13-J. Carbo-Nitriding. Harold N. Ipsen. *Metal Progress,* v. 66, Nov. 1954, p. 119-120.

Principles, advantages over other case hardening methods and equipment. Photograph, diagram.
(J28, ST)

14-J. Neutral Heat Treating. A. W. Frank. *Metal Progress,* v. 66, Nov. 1954, p. 121-122.

The prevention of any chemical reaction on the surface of metal being heat treated has been a long-sought objective, but has been realized only recently with the use of furnace atmospheres that are free of oxygen-bearing gases and moisture. Considerable economies are possible with such atmospheres.
(J2, ST)

15-J. Gas-Carburizing. *Aircraft Production,* v. 16, Nov. 1954, p. 466-468.

Equipment and methods utilizing a drip-feed liquid for producing a carburizing atmosphere. Photographs, diagram, graphs, table.
(J28, CN)

16-J. Fundamentals of Gas Carburizing. Walter Holcroft. *Industrial Heating,* v. 21, Nov. 1954, p. 2196 + 5 pages.

Equipment and methods, determination of case depth. Diagram, graphs, table. (J28, ST)

17-J. Theory of Furnace Gas Atmospheres. Allen G. Hotchkiss. *Industrial Heating,* v. 21, Nov. 1954, p. 2212 + 7 pages.

Gases, equilibrium data, carburizing reactions. Photographs, diagrams, graphs. (J2)

18-J. How to Reduce Heat Treating Costs When Using Ammonia. II. Paul E. Peacock, Jr. *Industrial Heating,* v. 21, Nov. 1954, p. 2234, 2236, 2238.

Operating costs in use of ammonia for hydrogen protection of bright finish of fine stainless steel wire during annealing. Graph, tables.
(J2, J23, SS)

19-J. Carburizing Controls at Caterpillar. L. A. Beaudry. *Instrumentation,* v. 7, no. 5, 1954, p. 4-6.

Carburizing cycle and control equipment for pit-type furnaces. Photographs, diagram. (J28, ST)

20-J. Proper Treatments Preserve Properties of Types 321 and 347 Stainless. Hiram Brown. *Iron Age,* v. 174, Nov. 25, 1954, p. 93-95.

Heat treatments and welding techniques required to maintain corrosion resistance. Micrograph, photographs. (J general, K general, R general, SS)

21-J. Measurement of Case Depth After Carburization. J. Taylor. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 291-296.

Empirically derived curves are more reliable than those calculated from mean value of diffusivity coefficient. Tables, graphs. 13 ref.
(J28, N1, ST)

22-J. A New Wear-Resisting Treatment. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 26, Nov. 6, 1954, p. 83-85.

Sulfurizing of steel and cast iron in a salt bath produces a soft, porous, but very wear resistant surface. (J28, Q9, CI, CN)

23-J. Special Atmosphere Graph for Heat Treatment Prepared From Natural Gas Analyses. *Materials & Methods,* v. 40, Nov. 1954, p. 135.

Chart for computing heat treating atmospheres. (J2)

24-J. Induction Heat Treating. Harry B. Osborn, Jr. *Metal Progress,* v. 66, Nov. 1954, p. 125-129.

Case histories indicate trend in induction heating toward ingenious fixtures for handling the work, often automatically, through cycles which produce selectively hardened areas to close specification. Costs are often cut further by using alloy and more readily machinable steel than required for older heat treating processes. Photographs. (J2, ST)

25-J. Controlled Atmosphere Heat Treating. I-II. Henry M. Heyn. *Steel,* v. 135, Nov. 22, 1954, p. 96-98; Nov. 29, 1954, p. 72-74.

Preparation of atmospheres, furnaces and control of compositions. Photograph, graphs, table. (J2, ST)

26-J. The Response to Heat Treatment of 18-8 Wires Given Various Percent Cold Reductions. Samuel Storchheim. *Wire and Wire Products,* v. 29, Nov. 1954, p. 1327-1330.

Possibilities of producing a highly magnetic state by repeated cold work and annealing at 1225° F. Tables, graphs. 2 ref. (J23, P16, SS)

27-J. (French.) **Electric Furnaces Having Submerged Electrodes.** *Métallurgie et la construction mécanique,* v. 86, no. 9, Sept. 1954, p. 671, 673.

Operating characteristics and advantages of salt bath furnaces. Photograph, diagram. (J2)

28-J. (German.) **Physics of Flame Hardening.** W. Marfels. *Schweissen und Schneiden,* v. 6, no. 10, Oct. 1954, p. 411-416.

Advantages, transformations, mechanical properties of surface and core, and distortion. Graphs, micrographs, diagrams. 8 ref. (J2, Q general, ST)

29-J. (Russian.) **Heat Treatment of Steel 18KhGT, With Application of a Solid Carbonizer.** K. A. Kashchenko. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 62-65.

Investigation for purpose of replacing steel 12KhN2 in the manufacture of equipment for the autotractor industry. Tables, graphs. (J28, AY)

30-J. Fundamentals of Annealing of Cold-Rolled Steel Strip. A. Pomp. *Henry Brutcher, Altadena, Calif. Translation no.* 3087, 14 p. (Abridged from *Stahl und Eisen,* v. 73, no. 3, 1953, p. 133-138.)

Previously abstracted from original. See item. 89-J, 1953. (J23, CN)

31-J. Continuous Annealing of Cold Rolled Low Carbon Steel Strip. II. K. H. Muhr and A. Pomp. *Henry Brutcher, Altadena, Calif., Translation no.* 3360, 16 p. (Abridged from *Stahl und Eisen,* v. 73, no. 14, 1953, p. 891-894.)

Results of continuous annealing experiments on seven grades of steel strip studied at different speeds of travel through the furnace and different rates of cooling in two temperature ranges to explore the effect of the annealing time on the tensile and deep drawing properties and microstructure. Photographs, graphs. 23 ref. (J23, CN)

32-J. Annealing of Malleable Iron Checked by the Magnetic Properties. K. P. Zhadnov. *Henry Brutcher, Altadena, Calif., Translation no.* 3383, 4 p. (From *Liteinoe Proizvodstvo,* v. 5, no. 1, 1954, p. 29-30.)

Previously abstracted from original. See item 109-J, 1954. (J23, P16, Q29, CI)

33-J. (Russian.) **Isothermal Hardening of Alloy Tool Steels.** Iu. A. Geller. *Stanki i Instrument,* v. 25, no. 10, Oct. 1954, p. 16-20.

Effects of temperature and time of holding on mechanical and physical properties. Graphs. 10 ref. (J26, Q general, P general TS)

34-J. Small Parts Hardened to Precise Limits in Sealed, Batch-Type Furnaces. W. G. Patton. *Iron Age,* v. 174, Dec. 2, 1954, p. 120-121.

Equipment and techniques. Photographs. (J26, ST)

35-J. Continuous Annealing of Steel Strip—Controls for a High-Speed Line. H. C. Morrow. *Mechanical Engineering,* v. 76, Dec. 1954, p. 990-994.

Line cleans and anneals 30 tons of tin plate per hr. Photographs. (J23, CN, Sn)

36-J. Heat Treating Inconels. T. A. Dickinson. *Metal Treating,* v. 5, Nov.-Dec. 1954, p. 4, 6.

Times and temperatures recommended for Inconel "W" and "X". Tables, photographs. (J general, Ni, Co)

37-J. (Czech.) **Controlled Atmosphere for Annealing Thin Steel Sheet.** Josef Teindl. *Hutnické Listy,* v. 9, no. 7, July 1954, p. 406-409.

Theory and equipment and process for use of producer gas. Graphs, diagrams, table. 10 ref. (J23, J2, ST)

38-J. (French.) **Heat Treatment of Flat Pieces.** G. Daniélou. *Métallurgie et la construction mécanique,*

v. 86, no. 10, Oct. 1954, p. 757, 759, 761.

Roller furnace for annealing tubes and bars, treatment of nonferrous metals, annealing of malleable cast iron, etc. Photographs, diagrams. (J23, ST, CI, EG-a)

39-J. (German.) **On the Heat Treatment of Age-Hardenable Copper-Nickel-Silicon Alloys.** K. Dies. *Metall,* v. 8, nos. 21-22, Nov. 1954, p. 842-846.

Effect of temperature, time and composition on mechanical and physical properties. Graphs, table. 3 ref.
(J27, Q general, P general, Cu)

40-J. Sub-Zero Heat Treatment. E. H. Clark. *Australasian Engineer,* 1954, Oct., p. 121 + 5 pages.

Required hardness and quenching problems and how they were solved. (J2, ST)

41-J. (German.) **Production of Cold-Rolled Dynamo Strip With Low Wattage Loss.** Werner Kunze. *Metallurgie und Giessereitechnik,* v. 4, no. 10, Oct. 1954, p. 431-432; disc., p. 432-434.

Heat treating and rolling practice. Photograph, graphs, table. (J general, F23, AY)

42-J. Drip-Feed Gas Carburizing. *Automobile Engineer,* v. 44, Dec. 1954, p. 549-552.

Principles and advantages of the Wild-Barfield "Carbodrip" system for case hardening ferrous alloys. Micrographs, photographs, diagram, graph, tables. (J28, ST)

43-J. How We Heat Treat Special Fastenings. T. W. Harker. *Industrial Gas,* v. 33, Dec. 1954, p. 6-7, 19-20.

Close control and uniform temperature in the clean annealing and heat treating of bolts and fastenings result in resistance to high temperatures and corrosion. Designed for use in gas and steam turbines, turbo-jet aircraft power plants and for atomic power applications. Photographs, diagram, micrograph. (J23, AY)

44-J. Some British Heat Treatment Furnaces. J. Lomas. *Machinery Lloyd (Overseas Ed.),* v. 26, Dec. 4, 1954, p. 99-102.

Pit-type preheating, gas carburizing, reheating and electric heat treating type furnaces, and heating elements. (J general)

45-J. Principles in the Heat Treatment of High Alloy Tool Steels. J. G. Ritchie. *Australasian Engineer,* 1954, Nov., p. 52-61.

Features of the equilibrium diagrams and their effect on hot working characteristics and directional properties. Reactions involved in hardening and tempering; selecting suitable heat treatment method. Micrographs, tables, graphs. 30 ref. (J general, TS)

46-J. Sixty-Cycle Induction Heating of Large Steel Sections for Hot Forming. II. C. H. Hartwig. *Industrial Heating,* v. 21, Dec. 1954, p. 2522 + 5 pages.

Temperature, current and power curves for heating ingots to rolling temperature. Graphs, tables, photograph. (To be continued.)
(J2, F21, CN, SS, AY, TS)

47-J. Below Zero Chilling Toughens Metals, Increases Tool Life. Victor Morris. *Machine and Tool Blue Book,* v. 50, Jan. 1955, p. 124-130, 132, 134.

Development, applications and advantages of the new industrial process in the field of metal stabilization. Graphs, photographs, table. (J2, TS, AY, W, SS, Al, Mg, Cu)

48-J. Improvement of Case Hardened Parts by Controlling Internal Stresses. Jacques Pomey. *Metal Progress,* v. 67, Jan. 1955, p. 147-153.

Proper compressive stresses at and near the surface which raise endurance limit by 40% can be put into a machine part by carbonitriding followed by heat treatments which produce either a bainitic core, a pearlitic core or a slightly spheroidized core, yet retain a surface approaching 1000 Vickers hard. Graphs, diagram, micrograph.
(J28, Q25, ST)

49-J. New Heat Treating Equipment in Great Britain. Tom Bishop. *Metal Progress,* v. 67, Jan. 1955, p. 154-158.

Annealing of aluminum foil without crinkling, heat treating clad aluminum in salt baths without staining, continuous flash annealing are a few of the nonferrous developments cited; on the ferrous side, the author describes a "drip-feed" liquid for generating a carburizing atmosphere, and a scale-free heating method not yet in use in this country. Photographs, table.
(J23, J2, J28, Al)

50-J. Alcohol Makes a Furnace Atmosphere. Milo J. Stutzman. *Steel,* v. 136, Jan. 17, 1955, p. 94, 96.

Heating of isopropyl alcohol-water mixtures produces carburizing or protective atmospheres which are easy to control. Photographs. (J2)

51-J. (Polish.) **Heat Treatment Methods for Surface Hardening of Rail Ends.** K. Pogorecki. *Hutnik,* v. 21, no. 8, Aug. 1954, p. 265-271.

Heating with oxy-acetylene flame; induction heating; tempering using heat of rolling. Graphs, tables, diagrams, photographs. 7 ref. (J28, J2, J29, CN)

52-J. Induction Heating Fixtures. D. Warburton-Brown. *Machinery Lloyd (Overseas Ed.),* v. 26, Dec. 18, 1954, p. 71-86.

Work coil is focal point of tooling. Diagrams, graphs. (J2)

53-J. How to Obtain High Quality Carburized Cases. H. E. Mansfield. *Materials & Methods,* v. 41, Jan. 1955, p. 134-137.

Optimum properties are obtained with a slightly hypereutectoid structure. Photograph, micrographs. (J28, ST)

54-J. Heat Treatment and Mechanical Properties of Ti-Cu Alloys. F. C. Holden, A. A. Watts, H. R. Ogden and R. I. Jaffee. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 117-125.

Variations and control of heat treatment to produce desired structures and mechanical properties. Transformation products are similar to those of carbon steel. Graphs, micrographs, table. 3 ref. (J general, N9, Q general, Ti, Cu)

55-J. Heat Treating Tool Steels. Water Hardening Types. Oil and Air Hardening Types. H. C. Manley and G. E. Brumbach. *Steel,* v. 136, Jan. 24, 1955, p. 70-73; Jan. 31, 1955, p. 72-74; Feb. 7, 1955, p. 111-114; Feb. 14, 1955, p. 87-90.

Effects of alloying elements on properties. Heat treating procedures. Transformations. Photographs, graphs. (To be continued.) (J general, Q general, N8, TS)

56-J. (Polish.) **Patenting of Steel Wires.** Zygmunt Steininger. *Wiadomosci Hutnicze,* v. 10, no. 12, Dec. 1954, p. 343-347.

Lead, salt and air methods and resulting structural changes. Mistakes to avoid. Graphs, diagram, micrographs. 15 ref. (J25, ST)

57-J. Quenching Conditions. C. Wilson. *Aircraft Production,* v. 17, Feb. 1955, p. 72-79.

Temperature changes in large high-strength light-alloy specimens. Photographs, diagram, graphs, tables. (J general, Al)

58-J. Induction Heating Steel With 60 Cycles. C. D. Kramer. *Applications and Industry,* 1955, no. 16, p. 353-355; disc., p. 356-357.

Effect of steel size and shape on heating efficiency. Photographs, graphs. 4 ref. (J2, ST)

59-J. Control in Heat Treatment. J. G. Solomon. *Australasian Engineer,* 1954, Dec., p. 54-61.

Control of raw materials, heat treating processes and final inspection. Table, micrographs, graphs, photographs. 12 ref. (J general, ST)

60-J. Titanium and Zirconium Tubing Annealed in Vacuum Furnace. *Industrial Heating,* v. 22, Jan. 1955, p. 28 + 6 pages.

Electric, 24-ft. batch-type furnace suitable for metals which must be protected against atmospheric contamination. Photographs, tables. (J23, Ti, Zr)

61-J. Endothermic Atmosphere for Heat Treatment of Steel. R. J. Perrine. *Industrial Heating,* v. 22, Jan. 1955, p. 38 + 11 pages.

Quality of atmosphere depends on air-fuel ratio, temperature, detention time and activity of catalyst. Photographs, diagram, graphs, tables. (J2, ST)

62-J. Practical Applications of Dew Point Measuring and Control. O. E. Cullen. *Industrial Heating,* v. 22, Jan. 1955, p. 52 + 8 pages.

Evidence for better control of carbon potential by measuring water vapor rather than carbon dioxide. Graphs, table, diagram photograph. (J2)

63-J. Salt Bath Hardening of Tools. Elmer B. Hauser. *Metal Progress* v. 67, Feb. 1955, p. 96-98.

Case history reporting that the salt bath method has increased output, quality and economy in heat treatment of high speed toolsteels at Weldon Tool Co. Table, photographs, micrographs. (J2, TS)

64-J. Heat Treatment of Titanium Alloys. Leonard D. Jaffe. *Metal Progress,* v. 67, Feb. 1955, p. 101-108.

Examination of published data leads to systematic interpretation based on known properties of existing microconstituents and their changes during heat treatment. Tables, graphs. 12 ref. (J general, N general, Q general, Ti)

65-J. Standard H-Steels, 4032-H to 4150-H. *Metal Progress,* v. 67, Feb. 1955, p. 108-B.

Data sheet giving hardenability ranges for above steels. (J28, AY)

66-J. Don't Neglect the Quench! D. F. Hammer. *Steel Processing,* v. 41, Jan. 1955, p. 39-46, 48.

Metallurgical effects of quenching, requirements of the quench and

ways of achieving these requirements. Graphs, micrographs, photograph. 3 ref. (J26, ST)

67-J. (German.) **Effect of Structure on Flame Hardenability of Gray Cast Iron.** Hans Wilhelm Grönegress. *Stahl und Eisen,* v. 75, no. 2, Jan. 27. 1955, p. 89-95.
Spheroidal graphite gives best response to surface hardening. Service experience. Tables, micrographs, graphs, photographs. 8 ref. (J2, M27, CI)

68-J. (Russian.) **Case Hardening of Ferritic Malleable Cast Iron by High-Frequency Heating.** M. O. Rabin and K. Z. Shepeliakovskii. *Liteinoe Proizvodstvo,* 1954, no. 9, Dec., p. 10-12.
Equipment and technique. Microstructure after various periods of heating. Applications. Micrographs, photographs, drawings. (J2, M27, CI)

69-J. (Russian.) **Furnaces for Annealing Malleable Cast Iron.** N. V. Sadin. *Liteinoe Proizvodstvo,* 1954, no. 9, Dec., p. 12-14.
Results of various time and temperature cycles in several furnaces. Graphs, tables. 4 ref. (J23, CI)

70-J. (Russian.) **Surface Hardening of Large-Size Crankshaft Journals, Using High-Frequency Current of a Low Specific Power for Heating.** G. M. Tel'nov and S. N. Sizov. *Vestnik Mashinostroeniia,* v. 34, no. 12, Dec. 1954, p. 66-68.
Description of method; factors involved; optimum conditions for operation. Diagram, table. (J2)

71-J. Continuous Batch Type Annealing Furnace. Ralph H. Gelder and Walter E. Hand. *Iron and Steel Engineer,* v. 32, Feb. 1955, p. 107-111.
Equipment, specifications, operating procedures. Photographs, graphs. (J23)

72-J. Continuous Carbonitriding Setup Promotes Safety, Uniform Quality. R. J. Belz. *Iron Age,* v. 175, Feb. 17, 1955, p. 95-97.
Integration of atmosphere hardening furnaces with an automatic quench, wash and draw unit for steering gear components. Photographs. (J28, AY)

73-J. Induction Heating. D. Warburton-Brown. *Machinery Lloyd (Overseas Ed.),* v. 27, Feb. 12, 1955, p. 88 + 9 pages.
Theory, equipment, losses, applications. Diagrams, photographs, tables, graphs. (J2)

74-J. How to Avoid Heat Treating Difficulties Through Correct Design of Press Tools. Federico Strasser. *Metal Treating,* v. 6, Jan.-Feb. 1955, p. 2-4, 6, 8, 10; disc., p. 11.
Interdependence of heat treating and design in toolmaking. Diagrams, photographs. (J general, TS)

75-J. Application of Nitriding to Hot Forging Dies. Alexander F. Sherys. *Metal Treating,* v. 6, Jan.-Feb. 1955, p. 14, 16-17.
Improvements in die life by surface hardening. Photographs. (J28, F22, TS)

76-J. Heat Treating Titanium. Leo Schapiro. *Metal Treating,* v. 6, Jan.-Feb. 1955, p. 20-21.
Heat treating cycles for commercial titanium alloys. Photographs, graphs. (J general, Ti)

77-J. Cooperation Between the Heat Treater and the Steel Manufacturer. C. B. Post. *Metal Treating,* v. 6, Jan.-Feb. 1955, p. 24-27.
Problems in heat treating various toolsteels. Photographs, micrograph. (J general, ST)

78-J. Experiences With Commercial Gas Carburizing Equipment. H. C. Thomas. *Steel Processing,* v. 41, Feb. 1955, p. 115-121.
Equipment, operating procedures and results. Photographs, diagram, micrograph, graphs. (J28, ST)

79-J. (German.) **Experiments on Relieving Internal Stresses Caused by Welding and Superposed Thermal Stresses.** K. Wellinger, Fr. Eichhorn, and Fr. Löffler. *Schweissen und Schneiden,* v. 7, no. 1, Jan. 1955, p. 7-14.
Annealing practice; measuring stresses and temperatures in test plates. Tables, graphs, diagrams. 5 ref. (J1, J23, K general, Q25, CN)

80-J. (German.) **Temperature Control of Electric Heat Treating Furnaces.** E. T. H. J. Horowitz. *Sprechsaal,* v. 88, no. 3, Feb. 5, 1955, p. 45-47.
Design and operation of various types of controls. Circuit diagrams, photograph. (To be continued.) (J general, S16)

81-J. (Swedish.) **Hardenability Test With Reference to Rapid Heating and Cooling Processes.** Tore Norén and Gerald Bini. *Svetsaren,* v. 19, nos. 2-3, 1954, p. 59-64.
Complement to the Jominy test which is more reproducible for determining weldability. Diagram, graphs, micrographs. 5 ref. (J26, K9, AY)

82-J. Heat Treatment of Ferrous Metals. *British Steelmaker,* v. 21, Feb. 1955, p. 50-58.
Features of recent installations in several British factories. Photographs, table. (J general, ST)

83-J Restore Surface Carbon in Sub-Critical and Over-Critical Anneal. J. D. Armour. *Iron Age,* v. 175, Feb. 24, 1955, p. 83-85.

Continuous annealing of cold drawn rod and wire in coils. Photographs, micrographs, tables. (J23, CN)

84-J. (Polish.) **Patenting of Steel Wire Heated Directly by Electric Current.** Julian Lasota. *Hutnik,* v. 21, no. 11, Nov. 1954, p. 352-356.

Laboratory equipment and advantages of process. Tables, graphs, diagram, micrographs. 4 ref. (J25, ST)

85-J. (Russian.) **Isothermal Heat Treatment of Nodular Cast Iron.** T. G. Demidova and M. N. Kuniavskii. *Liteinoe Proizvodstvo,* 1955, no. 2, Feb., p. 20-22.

Isothermal decomposition of austenite; microstructure and microhardness; wear resistance. Graphs, micrographs, diagram. 6 ref. (J26, M27, CI)

86-J. Electrical Control for Continuous Annealing Line. P. A. Travisano. *Blast Furnace and Steel Plant,* v. 43, Mar. 1955, p. 305-309, 314.

Details of equipment for handling up to 30 tons per hr. of light-gage steel strip. Photographs, diagrams. (J23, ST)

87-J. Heat-Treatment and Finishing Operations in the Production of Copper and Aluminium Rod and Wire. H. J. Miller. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 221-232 + 1 plate.

Annealing and heat treatment operations; factors determining surface quality of wires. Table, graphs, micrograph, photographs. 17 ref. (J23, Al, Cu)

88-J. Short Cycle Anneal Restores Ductility in Cold Extrusions. C. A. Turner, Jr. *Iron Age,* v. 175, Mar. 10, 1955, p. 96-99.

Equipment and operating procedures for fast and selective annealing of steel rocket heads. Photographs, micrographs, diagram. (J23, Q23, CN)

89-J. Mechanized Austempering Line Shortens Heat-Treating Time. H. K. Jamesson. *Iron Age,* v. 175, Mar. 24, 1955, p. 100-101.

Austempering of wrenches in a new line using electric salt bath furnaces and mechanized conveyors has reduced processing time from 10 to 1¼ hr. Treatment is in three steps—austenitize, quench and draw. Micrograph, photographs. (J26, CN)

90-J. (French.) **Quantitative Study of the Kinetics of Cooling Nickel Specimens During High Speed Quenching in Different Liquids.** Roland Bigot and René Faivre. *Comptes rendus,* v. 240, no. 7, Feb. 14, 1955, p. 774-775.

Cooling rates in mercury, petroleum, distilled water and brine. Cooling curves are plotted. Graphs. 8 ref. (J26, Ni)

91-J. (German.) **Hardening of Aluminum-Magnesium Alloys.** Otto Dahl and Klaus Detert. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 94-99.

Behavior during annealing; structure, hardness, tensile strength and elongation; changes of thermo-electric power and electrical resistance for interpreting precipitation behavior. Micrographs, graphs, tables. 15 ref. (J23, J27, M27, P15, Q29, Al, Mg)

92-J. (Japanese.) **Hardenability of Spring Steel.** Shigeo Owaku, Ryozo Isomura, Seinoshin Morikawa and Hatsukichi Sato. *Journal of Railway Engineering Research (Japan),* v. 12, no. 1, Jan. 10, 1955, p. 18-21.

Comparison of properties of several Japanese spring alloys. Diagrams, micrographs, graphs. (J26, SG-b)

93-J. Standard H-Steels, 5120-H to 6150-H. Data Sheet. *Metal Progress,* v. 67, Apr. 1955, p. 108B.

Hardenability bands for ten alloy steels. Graphs. (J26, AY)

94-J. Vacuum Heat Treating. I. Opportunity Knocks in the Micron Range. Richard L. Hoff and A. M. Bounds. *Steel,* v. 136, Apr. 11, 1955, p. 108-11.

Advantages of vacuum heat treating. Equipment. Photographs, table, graph. 6 ref. (J general)

95-J. Vacuum Heat Treating. II. Remove the Unwanted to Raise Performance Level. Richard L. Hoff and A. M. Bounds. *Steel,* v. 136, Apr. 18, 1955, p. 108-110.

Use of vacuum annealing to remove gases and unwanted compounds. Photographs, tables, graphs. (J23, Zr, Ti)

96-J. Practical Application of Furnace Atmospheres. Charles A. Mueller. *Metal Treating,* v. 6, Mar.-Apr. 1955, p. 2-7, 28.

Use of endothermic, exothermic, dissociated ammonia or dry nitrogen as atmospheres in heat treating operations. Diagrams, graphs, photograph. (J2)

97-J. Batch Carbon Restoration Annealing of Bar Stock. H. W. Calla-

han. *Metal Treating,* v. 6, Mar.-Apr. 1955, p. 10, 12, 14.

Principal heat treatments carried out in a batch controlled atmosphere furnace. Photographs. (J23, J2)

98-J. (English.) **Oxyacetylene Flame Hardening.** *Aciers Fins & Spéciaux Francais,* 1954, no. 18, Dec., p. 52-61.

A simple and practical means of effecting localized heating of surface of metals. Graph, diagrams, photographs, table. (J2)

99-J. (French.) **Continuous Muffle-Tube Furnaces.** *Métallurgie et la construction mécanique,* v. 87, no. 3, Mar. 1955, p. 209-211.

Application of furnaces in the annealing of soft steel and stainless steel tubes and stainless steel and refractory wires. Photographs. (J23, ST, SS)

100-J. Heat Treatments Standardize Part Structures for Automated Machining Lines. W. J. Behrens. *Iron Age,* v. 175, Apr. 28, 1955, p. 95-97.

Practice of one industrial concern to heat treat all incoming materials to establish uniform structure for its high-speed machining operations. Photographs. (J general, G17, TS)

101-J. Wide Steel Plate Continuously Heat Treated on New Integrated Line. W. D. Latiano. *Iron Age,* v. 175, May 5, 1955, p. 105-108.

The line handles plate to 130 in. wide and 40 ft. long on a continuous basis. Use of major materials handling devices has reduced the over-all time required in heat treating operations. Photographs. (J general, ST)

102-J. Heat Treating of Aluminum. George H. Thurston. *Light Metal Age,* v. 13, Apr. 1955, p. 8-11, 27.

Steps involved and manner in which they deviate from standard ferrous metals practice. Photographs. (J general, Al)

103-J. Steam Heat Treating Boosts Processing Efficiency. Fred L. Spangler. *Steel,* v. 136, May 9, 1955, p. 82-84.

Temper, anneal and stress-relieve in steam atmosphere to get scale-free work. Method imparts wear and corrosion resistance and reduces finishing operations. Photographs, table. (J2, TS)

104-J. Equilibrium Curves. Their Application to Furnace Atmospheres. N. K. Koebel. *Steel Processing,* v. 41, Apr. 1955, p. 247-552.

Brief review and comparison of theoretical equilibrium curves, calculated by means of the phase rule, with the empirical equilibrium curves recently derived by direct measurement methods in industrial furnaces. Graphs. 5 ref. (J2)

105-J. The Production of Patented Wire for Valve Springs. O. Page. *Wire Industry,* v. 22, Apr. 1955, p. 411 + 7 pages.

Consideration of the various problems arising, along with an outline of certain methods of overcoming them. Graphs, micrographs, photographs. (J25, F28, ST)

106-J. (Russian.) **Toughness and Wear-Resistance of Automobile Parts Treated by Gas Cyanding.** A. M. Tarasov and B. A. Stetsenko. *Avtomobil'naia i traktornaia promyshlennost',* 1955, no. 3, Mar., p. 21-24.

Cyaniding techniques; microstructure of treated layer; comparison of gas and liquid processing. Photographs, graphs, tables, micrographs, diagrams. 3 ref. (J28, M27, Q23, Q9)

107-J. (German.) **Steel Castings for Double-Duro Hardening.** Hans Wilhelm Grönegress. *Giesserei,* v. 42, no. 8, Apr. 14, 1955, p. 170-175.

Optimum composition; influence of carbon content on hardenability; heat treatment; fields of casting applications. Photographs, table, graphs, micrographs. 7 ref. (J general, T general, CI)

108-J. (Russian.) **Nitriding of Magnesium Cast Iron.** V. D. Iakhnina. *Liteinoe Proizvodstvo,* 1955, no. 4, Apr., p. 23-25.

Corrosion tests, porosity, brittleness, microhardness, depth of nitrided layer. Heat treatment of nitrided metal. Graphs, micrographs, tables. 4 ref. (J28, CI)

109-J. (Russian.) **Prevention and Correction of Defective Pieces During the Heat Treatment of Cutting Tools.** I. E. Khelimskii and Z. I. Fel'dshtein. *Stanki i Instrument,* v. 26, no. 3, Mar. 1955, p. 22-25.

Quenching and annealing treatments, welding of cutting tools, weld inspection methods. Tables, diagrams. (J26, J23, K general, TS)

110-J. (Russian.) **Strengthening of Machine Parts by the Electrode-Spark Method.** L. A. Mirkin. *Vestnik Mashinostroeniia,* v. 35, no. 4, Apr. 1955, p. 48-51.

Electrodes used, hardness and wear resistance of surfaces hardened, advantages. Graphs, table, diagram. (J28, ST, CI)

111-J. Viewpoints on the Linde Method of Stress Relieving. R. Gunnert. *British Welding Journal,* v. 2, May 1955, p. 200-204.

Effectiveness of the method in reducing transverse stresses and the extent to which longitudinal stresses can be reduced. Graphs, table. 11 ref. (J1)

112-J. Some Considerations of the Action of Energisers in Solid Carburising Agents. H. Schrader. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 61-78; disc., p. 78-80.

Composition of solid carburizing agents and types of common additions used for energizing. Tables, graphs. 11 ref. (J28)

113-J. Heat Treating Precision Equipment for Aircraft. Frank Crahen. *Industrial Gas,* v. 33, May 1955, p. 5-7, 24.

Versatile batch-type furnaces provide part and process flexibility required for heat treating about 800,000 lb. of precision electrical, hydraulic and mechanical components on job-lot basis. Photographs. (J general)

114-J. Continuous Car Bottom Furnaces. Walter J. Assel. *Industrial Heating,* v. 22, Apr. 1955, p. 732 + 4 pages.

Continuous car bottom versus roller hearth, rotating hearth and pusher-type furnaces. Photographs. (J general)

115-J. Salt Bath Furnace Performs Four Different Operations. E. W. Kerman. *Iron Age,* v. 175, May 19, 1955, p. 124-126.

First intended for carburizing only, is now doing three other jobs —simultaneous brazing and carburizing, brazing and hardening. Photographs. (J2)

116-J. Using Dew Point for Automatic Control of Heat Treatment Atmospheres. Peter Trippe. *Metalworking Production,* v. 99, May 13, 1955, p. 861-863.

Recently developed system to facilitate automatic control of furnace atmosphere in heat treatment processes by detecting and controlling the dew point and therefore the carbon potential. Photographs, graphs. (J2)

117-J. The Heat Treatment and Working of Haynes 25 Alloy. H. A. Blank, A. M. Hall, J. H. Jackson, J. W. Frank, and W. K. Anderson. *U. S. Atomic Energy Commission,* BMI-814, 1953. 31 p.

Primary objectives were to determine the upper limit of hardness, produced by cold working, at which Haynes 25 alloy can be satisfactorily machined, and the aging conditions that produce the highest hardness in the alloy. Corollary objectives were to improve the alloy's machinability and response to aging, as well as its wear resistance, by adjustment of composition. Graphs, tables, photographs. (J27, G17, SG-m)

118-J. (Dutch.) **Interrupted Quench Hardening of Steel.** C. H. Luiten. *Smit Mededelingen,* v. 10, no. 1, Jan.-Mar. 1955, p. 26-32.

Practical applications when hardening high speed steel, hot work steel, and low-alloyed steel; survey of different hot quenching baths. Particular attention is paid to a salt bath with built-in propeller-agitator, cooler and special salt strainers. Graphs, photographs. 17 ref. (J26, ST)

119-J. (German.) **Vertical Heat Treatment Furnaces for Metal Bands.** Friedrich C. L. Eisenmenger. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 264-268.

Description and structural details. Diagram, photographs. (J general)

120-J. Laboratory Workshop Practice. VI. Heat Treatment of Steels. A. Thompson. *Laboratory Practice,* v. 4, May 1955, p. 202-206.

In the laboratory the openhearth method is generally used for the hardening of small tools because of its cheapness and comparative convenience. Tables, diagrams. (J26)

121-J. Heat Treating Aluminum Alloy Aircraft Parts—A Builder's Viewpoint. R. H. Gassner. *Metal Progress,* v. 67, June 1955, p. 75-79.

How metallurgical principles dictate the requirements of heat treating equipment for wrought aluminum alloys. Graphs, photographs. (J general, Al)

122-J. An Alloy Manufacturer's Viewpoint. K. B. Baker. *Metal Progress,* v. 67, June 1955, p. 80.

A discussion of the need for adequate heating and cooling equipment in heat treating aluminum and magnesium alloy parts. (J2, Al, Mg)

123-J. Furnaces for Heat Treating Aluminum and Magnesium. D. W. Pettigrew. *Metal Progress,* v. 67, June 1955, p. 81-83.

Four major factors influence design of furnaces for heat treatment of aluminum and magnesium: temperature control, heat input, material handling and atmosphere requirements. Present high production rates have increased the importance of material handling. Photographs, diagram. (J general, A5, Al, Mg)

124-J. Salt Bath Furnaces for Aluminum. Bernard P. Planner. *Metal Progress,* v. 67, June 1955, p. 84-86.

Salt baths offer many advantages for heat treatment of aluminum aircraft alloys, including high treating rates, close temperature control, freedom from atmosphere attack. Graphs, diagram, table, photograph. (J2, Al)

125-J. Surface Protection of Titanium and Stainless Steel During Heat Treatment. Horace Drever. *Metal Progress,* v. 67, June 1955, p. 87-90.

Vacuum furnaces have proved successful in preventing embrittlement of titanium during annealing. Extremely dry hydrogen is being used successfully in both bright hardening and bright annealing of stainless steels. Photographs, table. (J2, Ti, SS)

126-J. Controlled-Atmosphere Furnaces. Carl L. Ipsen. *Metal Progress,* v. 67, June 1955, p. 91-95.

Survey of the representative types of controlled-atmosphere furnaces, their advantages and major fields of application. Photographs. (J2)

127-J. Gas Combustion Equipment. A. D. Wilcox. *Metal Progress,* v. 67, June 1955, p. 95-99.

Important properties of commercial gases that affect combustion and a description of the basic combustion systems being used in industry. Tables, graphs, diagrams. (J general)

128-J. Tunnel Furnace Is Low-Cost Annealer. *Steel,* v. 136, May 30, 1955, p. 78.

By designing out overhead cranes and special, car-return mechanism, a lightweight metal building was sufficient. Car bottoms hold 1400 lb. per linear ft. of hearth. Photographs. (J23, ST)

129-J. Annealing Control Makes the Difference. Edward J. Moritz. *Steel,* v. 136, May 23, 1955, p. 104-105.

Roller-hearth furnace assures uniform high quality electrical steel. Annealing costs are no higher than those of former batch-furnace method. Photograph, flow chart. (J23, AY)

130-J. Fast Quench Reduces Heat Treat Distortion. George Perkins and H. D. Bitner. *Tool Engineer,* v. 34, June 1955, p. 108-110.

Use of the salt quench technique to solve problems of distortion of heat treated parts. Photographs. (J2, Al, AY)

131-J. Gas Carburizing. L. G. W. Palethorpe. *Wild-Barfield Heat-Treatment Journal,* v. 5, Mar. 1955, p. 8-12.

Theory, equipment, procedures. Graph, micrographs. 7 ref. (J28)

132-J. Heat Treatment and Finishing Operations in the Production of Copper and Aluminium Rod and Wire. I. H. J. Miller. *Wire Industry,* v. 22, May 1955, p. 495, 498-500, 502.

Influence of early processing operations on the properties of the final product. Copper wire annealing furnaces and methods. Table, graph. (J23, Al, Cu)

133-J. (Czech.) **Contribution to the Structure of Layers Treated by Means of Electric Sparks.** Miroslav Cermak. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 215-221.

Best treatment of steel surface will result when using electrodes made from sintered titanium and tungsten carbides. Tables, graphs, micrographs. 7 ref. (J28)

134-J. (Polish.) **Interoperational Annealing of 13% Chromium Stainless Steel.** Z. Wojcik. *Hutnik,* v. 22, no. 2, Feb. 1955; *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa,* v. 6, no. 2, 1955, p. 5-7.

Isothermal annealing; dilatometric and metallographic investigations. Heat treatment on laboratory and quasi-industrial scale. Micrographs, graphs, tables. (J23, N8, SS)

135-J. (Russian.) **New Methods of Heat Treatment and Chemico-Thermal Treatment of Metal in Salt Baths.** A. I. Zot'ev. *Vestnik Mashinostroeniia,* v. 35, no. 5, May 1955, p. 67-71.

Review of reports on bright dip, bright annealing, variations of the wire patenting process, sulfiding and use of carnallite as heating and cooling media. (J2, ST)

136-J. The Heat Treatment of Carburising Steels. F. P. Heard. *Australasian Engineer,* 1955, Apr., p. 44-50.

Selection of carburizing steels and heat treatment for machinability. Gas and pack carburizing procedures. Tables, diagrams, graphs, micrographs. 8 ref. (J28, G17, CN, AY)

137-J. Magnetic Recording Measures Cooling. Rodney P. Elliott. *Frontier,* v. 18, Summer 1955, p. 17-19.

During quenching the cooling rate at a given point can be determined by measuring the rate of voltage change at the thermocouple junctions. Photographs. (J26, S16, CN, Ti)

138-J. Individual Heat Treatment of Quality Rolls. *Industrial Heating,* v. 22, May 1955, p. 976-978.

Annealing, normalizing, quenching, tempering and combination practices. Photographs. (J general)

139-J. Better Copper Tubing Starts With Accurately Controlled Annealing. Victor Peterson. *Iron Age,* v. 175, June 2, 1955, p. 87-89.

Accurate control over annealing cycles will give the grain size uniformity and scale-free surfaces so essential to the drawing qualities of copper tubing. Photographs, micrographs. (J23, Cu)

140-J. Heat Treatment to Precision Limits. *Mechanical World and Engineering Record,* v. 135, May 1955, p. 228-229.

Heat treatment and case hardening of repetition parts to close limits in plants in which unique control equipment leaves no room for error. Photographs. (J general)

141-J. Uniform Hardness for 410 Stainless Castings. W. B. F. Mackay. *Precision Metal Molding,* v. 13, June 1955, p. 40-41, 88.

Study of the effectiveness of various heat treatments. Photographs, micrograph, graphs. (J general, Q29, SS)

142-J. Heat Treating Aluminum. I. Wrought Alloys. W. A. Anderson. *Steel,* v. 136, June 6, 1955, p. 83-86.

Data on annealing, quenching, aging, cold treatment and reheating of the alloys. Photographs, graphs, tables. (J general, Al)

143-J. Heat Treating Aluminum. II. Castings. W. A. Anderson. *Steel,* v. 136, June 13, 1955, p. 146-148.

Furnaces used, time, quenching, aging, stresses, annealing, short cuts and techniques. Graphs, photograph, micrograph, table. (J general, Al)

144-J. Heat Treating Dies in Salt Bath Furnaces Aids Production of Fastenings at H. M. Harper Co. K. G. Hookanson. *Industrial Heating,* v. 22, June 1955, p. 1153A-1154, 1156, 1158.

Die hardening furnaces and heat treat cycles. Photographs, digaram. (J2, TS)

145-J. Heat Treating—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2C-14C.

Progress and outlook for fuels, furnaces and procedures. Photographs. (J general)

146-J. Change to Gas-Carburizing Improves Piston Pins. R. E. Haislip. *Materials & Methods,* v. 41, June 1955, p. 140-143.

Shorter production cycle resulted and uniformity increased markedly through each pin and from pin to pin. Photographs, tables, diagrams. (J28)

147-J. Some Recent Furnace Installations. Applications in the Fabrication and Heat Treatment of Metals. *Metallurgia,* v. 51, no. 308, June 1955, p. 283-300.

Indicates trends of development in furnace design by showing and describing briefly a few of the more recent installations in England and the purposes for which they are being applied. Photographs, diagrams. (J general)

148-J. Bright Hardening and Bright Tempering of Corrosion-Resistant and High-Temperature Alloys. T. W. Harker. *Metal Treating,* v. 6, May-June 1955, p. 2-4.

Heat treating equipment and cycles for fastenings and bolts for elevated temperature use. Photographs, micrograph. (J26, J29, SG-g, h)

149-J. Commercial Heat Treating Shops in France. Bernard Jousset. *Metal Treating,* v. 6, May-June 1955, p. 12, 14-16, 37.

Equipment, materials, procedures. Photographs. (J general)

150-J. A Review of Salt Bath Carburizing. I. E. N. Case. *Metal Treating,* v. 6, May-June 1955, p. 18-19.

Applications, advantages, processing details. Photographs. (To be continued.) (J28, J2, ST)

151-J. Heat Treating Magnesium. M. E. Brooks. *Steel,* v. 137, July 11, 1955, p. 88-91.

Treatment of magnesium for the maximum production of castings, extrusions, sheet and plate products. Photographs, micrographs, tables. (J general, Mg)

152-J. Gas Carburizing—a Controlled Production Tool. F. E. Russ. *Steel Processing,* v. 41, June 1955, p. 383-390.

Equipment, materials, methods. Photographs, graph. (J28)

153-J. Commercial Annealing and Quenching Plus Tempering of Cold-Drawn Steel Bars With Special Consideration of Scaling, Decarburization, Heating Rate, and Temper Brittleness. II. Quenching Plus Tempering of Cold-Drawn Steel. W. Hulsbruch. *Henry Brutcher Translation No.* 2965, 18 p. (From *Stahl und Eisen,* v. 70, no. 15, 1950, p. 647-653.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 220-J, 1950. (J23, J29, ST)

154-J. Rapid Gas Carburizing by Induction Heat. A. D. Assonov, K. Z. Shepelyakovskii and P. A. Lankin. *Henry Brutcher Translation No.* 3468, 10 p. (Condensed from *Vestnik Mashinostroeniya,* v. 34, no. 6, 1954, p. 56-60.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 253-J, 1954. (J2, ST)

155-J. Cold Treatment of Chrome-Tungsten-Manganese Tool Steel. L. I. Gardina. *Henry Brutcher Translation No.* 3505, 6 p. (From *Vestnik Mashinostroeniya,* v. 33, no. 11, 1953, p. 54-55.) Henry Brutcher, Altadena, Calif.

Study of effect of cold treating of a toolsteel upon its mechanical properties and cutting performance, based on hardness tests, micrographic analysis, determination of magnetic properties, slow bend, and torsion impact tests. Tables, graph. (J26, Q general, P16, TS)

156-J. Low-Frequency Heating of Aluminum Billets. H. Rohn. *Henry Brutcher Translation No.* 3478, 10 p. (From *Aluminium,* v. 30, no. 7, 1954, p. 298-300.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 256-J, 1954. (J2, Al)

157-J. (German.) **Induction Hardening and Its Applications.** H. Voss. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 173-180.

Demonstrates the numerous uses of surface hardening by heating the hardenable metal with induced medium or high-frequency current. Photographs, tables. 7 ref. (J2)

158-J. (Polish.) **Vessels for the Annealing of Rolled and Drawn Objects.** Kazimierz Janas. *Wiadomosci Hutnicze,* v. 11, no. 1, Jan. 1955, p. 18-20.

Properties of materials used for annealing vessels, factors affecting service life, effect of design of vessel on annealing time and temperature. Diagrams. (J23, T5, ST)

159-J. Propeller-Agitated Quenching. *American Machinist,* v. 99, July 18, 1955, p. 155, 157, 159; Aug. 1, 1955, p. 129, 131.

Effectiveness of and general rules for cooling the quench baths; number of agitating units required. Table, graphs, photographs, diagrams. (To be continued). (J26)

160-J. Simplify Approach to Titanium Heat Treatment. P. D. Frost. *Iron Age,* v. 175, June 30, 1955, p. 65-68.

Analysis of the metallurgy of titanium alloys permits the fabricator to make better use of them and to understand their behavior and their susceptibility to "omega" embrittlement in hot forming and heat treating. Diagram, graphs, micrographs. 1 ref. (J general, Ti)

161-J. Improve Cast Aluminum Alloys by Heat Treatment. B. L. Meredith. *Materials & Methods,* v. 42, July 1955, p. 108-110.

Use of solution and aging treatments to obtain better mechanical properties, stress-relief to maintain dimensional accuracy, and stabilizing to obtain low stress level. Photographs, graph. 1 ref. (J27, J29, Q general, Al)

162-J. Europe's Largest Furnace for Continuous Gas Carburizing. T. E. W. Preston. *Metalworking Production,* v. 99, July 8, 1955, p. 1205-1212.

Design, construction and operation of a furnace which uses the enriched carrier gas technique for supplying carbon to work to be case hardened; butane, cracked on the work, gives the free carbon; temperature control of the order of ±5° F. achieved. Photographs, diagrams. (J28)

163-J. The Metallographic View. XII. Hardenability, Its Meaning. H. E. Boyer. *Steel Processing,* v. 41, July 1955, p. 432.

Definition of the term hardenability, factors which effect it in the heat treatment of steels. Diagram. (J26, ST)

164-J. High Powered Induction Heating in Shell Forging. H. J. Landsman and A. T. Lattauzeo. *Steel Processing,* v. 41, July 1955, p. 453-457.

Installation for heating the nose end of 8-in. and 155-mm. artillery shells prior to forging the nose. Photographs, diagrams. (J2, F21)

165-J. Hardening by Induction. Fred Spencer. *Tooling and Production,* v. 21, July 1955, p. 55-58, 66, 72.

Applications, advantages and limitations of the method. Diagram, table, photographs. 5 ref. (J2, ST)

166-J. (Hungarian.) **Martensite Tempering of Tool Steels.** Odön Szabo. *Kohaszati Lapok,* v. 10, no. 6, June 1955, p. 262-272.

Experiments for evolving method of toolsteel tempering in a salt bath for decreasing rejects caused by deformation and quenching cracks. Tables, graphs, diagram, micrographs. (J26, TS)

167-J. (Hungarian.) **Induction Heating of Aluminum Cores.** Laszlo Zelenka. *Kohaszati Lapok,* v. 10, no. 6, June 1955, p. 275-278.

Theoretical considerations, applicability and effectiveness of proc-

ess. Diagrams, graphs, tables. 8 ref. (J2, Al)

168-J. Carbon Restoration Annealing for Uniformity of Bar Stock Structure. H. W. Callahan. *Industrial Heating,* v. 22, July 1955, p. 1412 + 5 pages.

Summary of the principal heat treatment carried out in a batch controlled atmosphere furnace, types of steels, range of stock sizes processed. Photographs, micrographs, diagrams. (J23)

169-J. Gas Purge for Consistent Carburizing Quality. P. M. Unterweiser. *Iron Age,* v. 176, July 28, 1955, p. 72-74.

Furnace purging with cracked city gas does not soot electrical resistance control elements. Photograph, graph, micrographs. (J28)

170-J. Fast Heating Is Practical and Safe. H. G. Grim. *Steel,* v. 137, July 18, 1955, p. 104-105.

Heating 20-ton work loads of die blocks for hardening in a cycle of 3 to 4 hr. Photographs, graph. (J26, ST)

171-J. Hardenability of Carbo-Nitrided Carbon Steel. R. H. Marshall. *Metal Progress,* v. 68, Aug. 1, 1955, p. 91-93.

Increase in grain size or manganese content increases hardenability of carbo-nitrided carbon steels. Effect of grain size is greater than the effect of manganese in the range investigated. Tables, graphs. (J26, ST)

172-J. 4000° F. Gas Furnace. Horace B. Drever. *Metal Progress,* v. 68, Aug. 1, 1955, p. 94-95.

A completely automatic gas-fired furnace developed in England is capable of continued operation in the range of 3200 to 4000° F., using air rather than oxygen for combustion. Photographs. (J general)

173-J. Hardenability Bands for Tentative Standard H-Steels, Boron-Treated. *Metal Progress,* v. 68, Aug. 1, 1955, p. 104B.

Hardenability curves and data issued by the American Iron and Steel Institute. Graphs. (J26, AY)

174-J. Heat Treating Stainless Steels. I-II. W. E. McFee. *Steel,* v. 137, Aug. 8, 1955, p. 70-72; Aug. 15, 1955, p. 158-160, 162.

Precautions and details in annealing and hardening martensitic-chromium and PH types. Graphs, tables, photographs. (J23, J26, SS)

175-J. (French.) **A Case of Heat Treating Cast Irons: Annealing Treatment.** Gabrielle Aubrion. *Fonderie,* 1955, no. 113, June, p. 4563-4572.

Different types of annealing treatment, practical examples. Micrographs, photograph, diagram. Graphs. (J23, CI)

176-J. (French.) **Heat Treatments for Cast Steels.** *Fonderie,* 1955, no. 113, June, p. 4573-4575.

Annealing of unalloyed steels, quenching and tempering methods. Tables, micrographs. (J23, J26, J29, CI)

177-J. (German.) **A New Investigation of the Problem of Hardening.** Werner Köster. Paper from "L'état solide". Institut International de Physique Solvay, p. 235-261; disc., p. 262-271.

Kinetic measurements for determination of the relationship between cold and hot hardening of aluminum-silver alloys, influence of quenching stress on the kinetics of hardening, residual stresses during hardening. Tables, graphs, diagrams. 41 ref. (J26, J27, Q25, Al, Ag)

178-J. (Russian.) **Study of the Temperature of the Spark From the Apparatus for Electro-Spark Hardening of Metals.** A. N. Liulichev and L. S. Palatnik. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia,* v. 19, no. 1, Jan.-Feb. 1955, p. 66-67 + 1 plate.

Relation between electrode diameter and spark temperature; effect of condenser capacity; spectroscopic analysis of spark. Spectrographs. 5 ref. (J28)

179-J. Modern Furnaces Can Pay Their Way. A. H. Koch. *American Machinist,* v. 99, Aug. 15, 1955, p. 112-115.

Recent developments in construction materials, design and mechanized equipment. Photographs, diagrams. (J general)

180-J. Town Gas for the Heat Treatment of Metals. G. A. Peterson. *Australasian Engineer,* 1955, June, p. 56-61.

Advantages of gas heating, use of special atmospheres prepared from town gas, manual and automatic control of gas equipment, design of gas fired furnaces. Diagram, photographs. 8 ref. (J2)

181-J. Low-Frequency Induction Melting and Heating. R. K. Treloar. *Australasian Engineer,* 1955, June, p. 62-69.

Principles; history and development of induction furnaces; present applications. Diagrams, photographs. (J2, C21, D6)

182-J. Special Setup for Heat Treating Greatly Reduces Fire Hazard. Joseph Geschelin. *Automotive*

Industries, v. 113, Aug. 1, 1955, p. 70-72, 113.

Ford Livonia plant is designed with the heat treating plant isolated in a corner of the area and capable of being sealed off, if necessary. Photographs. (J26, A7, CN)

183-J. A Review of Some Factors Influencing Nitriding Practice. G. J. Cox. *Birmingham Metallurgical Society, Journal,* v. 35, June 1955, p. 213-230.

Effects of temperature, time, surface condition, pressure and other variables on properties of nitrided steels. Graphs, tables. 49 ref. (J28, ST)

184-J. Isothermal Hardening of Alloy Tool Steels. Iu. A. Geller. *Engineers' Digest,* v. 16, July 1955, p. 323-325. (Translated from *Stanki i Instrument,* 1954, no. 10, Oct., p. 16-20.)

Previously abstracted from original. See item 33-J, 1955. (J26, N8, TS)

185-J. How Bendix Aviation Heat Treats Magnesium. Al Ludwig. *Industrial Gas,* v. 34, Aug. 1955, p. 3-5, 24.

Utilization of CO_2 furnace atmosphere results in higher and more consistent physical properties than were obtained from former installations with SO_2 atmospheres. Photographs, graph. (J2, Mg)

186-J. Which Method for High Speed Surface Hardening? W. S. Hyler and H. J. Grover. *Materials & Methods,* v. 42, Aug. 1955, p. 103-105.

Advantages and limitations of induction and direct gas heating compared; production costs evaluated. Photographs, table. 6 ref. (J28)

187-J. Modern U.S. Gas Carburising and Carbonitriding Practice. Norbert K. Koebel. *Metallurgia,* v. 52, no. 309, July 1955, p. 3-10.

Early gas carburizing practice, modern practice, principle of the endothermic generator for producing the carrier gas, modern gas carbo-nitriding process, design of modern carburizing and carbo-nitriding furnaces. Photographs, diagrams, graphs. (J28)

188-J. A Review of Salt Bath Carburizing. II. E. N. Case. *Metal Treating,* v. 6, July-Aug. 1955, p. 8-9, 33.

Catalysts, advantages and applications of cyanide baths. Photographs, graphs. (J28, J2)

189-J. An Unusual Commercial Heat Treating Plant. *Metal Treating,* v. 6, July-Aug. 1955, p. 12-13, 26.

Description and operation of plant which provides effective control of heating, cooling and atmosphere. Photographs. (J general, A5)

190-J. Commercial Bright Hardening of Stainless Steels. Fred Hunter. *Metal Treating,* v. 6, July-Aug. 1955, p. 20-22.

Equipment and operation of a controlled atmosphere heat treatment furnace. Diagram, photographs, table. (J2, SS)

191-J. A New Technique for the Surface Hardening of Crankshafts. Tom Bishop. *Metal Treatment and Drop Forging,* v. 22, July 1955, p. 295-298.

Patented German induction heating units and process. Photographs. (J2, CI)

192-J. Titanium Alloys Are Heat Treatable. C. R. Cook. *Metal Treating,* v. 6, July-Aug. 1955, p. 2-4, 6, 33.

Heat treatment, structure and properties of various types of alloys. Tables, micrographs. (V, J general, Ti)

193-J. Flame-Hardening by Oxy-Town Gas. *Metalworking Production,* v. 99, July 22, 1955, p. 1291-1292.

Some typical examples, including description of machines installed for hardening diesel crankshaft pins and journals. Photograph. (J2, CN)

194-J. Is Oil Quenching Best for Pearlitic? John E. Kruse. *Modern Castings and American Foundryman,* v. 28, July 1955, p. 85-90.

Effects of variations in heat treatment on strength and structure of malleable iron. Micrographs, graphs, tables. 6 ref. (J26, Q23, M27, CI)

195-J. Annealing of Point Defects in Metals and Alloys. W. M. Lomer and A. H. Cottrell. *Philosophical Magazine,* v. 46, 7th ser., no. 378, July 1955, p. 711-719.

Analysis of published data on the recovery of resistivity during annealing of metals at low temperatures, after damage by irradiation, quenching or cold work. Table. 12 ref. (J23)

196-J. Quench Hardening in Aluminium Single Crystals. R. Maddin and A. H. Cottrell. *Philosophical Magazine,* v. 46, 7th ser., no. 378, July 1955, p. 735-743 + 1 plate.

Results of experiments to alter state of imperfection in single crystals of aluminum by means of heat treatment, and to examine this effect on the plastic properties of the crystals. Diagram, graph, tables, micrographs. 7 ref. (J26, Al)

197-J. Mercury Arc Rectifiers for Frequency Changing on Induction Heating Equipment. *Wild-Barfield Heat-Treatment Journal,* v. 5, June 1955, p. 2-6.

Operating cycle and advantages over oil or gas-fired furnaces. Graphs, diagram, photograph. (J2)

198-J. Gas Carburizing Atmospheres. L. G. W. Palethorpe. *Wild-Barfield Heat-Treatment Journal,* v. 5, June 1955, p. 10-15.

Separately generated atmospheres, furnace generated (drip feed) atmospheres, proprietary Carbodrip atmosphere. Tables, diagrams, photographs. (To be continued.) (J28, J2, ST)

199-J. (Dutch.) **Heat Treatment of Aluminum-Magnesium Alloys With 9% and Higher Magnesium Content.** L. J. G. van Ewijk. *Metalen,* v. 10, no. 13, July 15, 1955, p. 269-273.

Basic composition of alloys (A 9, A 10.5, A 12, B 9, B 10.5, B 12). Influence of heat treatment conditions on the strength properties of alloys. Photographs, tables, diagrams. (To be continued.) (J general, Q23, Al)

200-J. (Dutch.) **Heat Treatment of Aluminum-Magnesium Alloy With 9% Magnesium or More.** L. J. G. van Ewijk. *Metalen,* v. 10, no. 14, July 30, 1955, p. 291-297.

Structure analysis, strength properties. Graphs, diagram, photographs, micrographs. 1 ref. (J general, M general, Q23, Al, Mg)

201-J. (French.) **The Superficial Hardening of Steel Pieces and Progress Obtained With Controlled Nitriding.** R. Lambert. *Revue de métallurgie,* v. 52, no. 7, July 1955, p. 553-558; disc., p. 558.

Considers constant temperature nitriding. Controlled process gives a more malleable surface. Graphs, photographs. (J28, ST)

202-J. (French.) **Flame Hardening of Cast Iron and Its Practical Application.** H. W. Gronegress. *Revue de métallurgie,* v. 52, no. 7, July 1955, p. 559-568.

Critical factors for gaging flame hardenability are the carbon content and graphite distribution, the propensity to crack formation decreases in proportion to the fineness of graphite distribution, utilization of hardened cast iron, necessary equipment. Tables, graphs, photographs, micrographs. 14 ref. (J2, CI)

203-J. (German.) **Fundamentals and Requirements for the Accomplishment of the Oxy-acetylene Stress Relieving.** H. G. Kunz. *Schweissen und Schneiden,* v. 7, no. 7, July 1955, p. 291-297.

Fundamentals, equipment and materials for stress-relief, applications. Table, graphs, diagrams, photographs. (J1, ST)

204-J. (German.) **Is Low Temperature Annealing Necessary?** W. Soete. *Schweissen und Schneiden,* v. 7, no. 7, July 1955, p. 300-305.

Influence of initial stresses on deformations, brittle fracture of steel, fatigue of materials, stability of construction, and on corrosion. Graphs, diagrams, photographs. 12 ref. (J23, Q23, Q7, R general, ST)

205-J. (Russian.) **Heat Treatment of Welded Cutting Tool.** E. I. Malinkina. *Stanki i Instrument,* v. 26, no. 7, July 1955, p. 28-29.

Cause and prevention of cracks after heat treatment. Graphs, diagram, photograph. 4 ref. (J general, TS)

206-J. The Effect of Tempering Treatment on the Corrosion Resistance of Hardened 13% Chromium Steels. J. E. Truman. *Corrosion Technology,* v. 2, Aug. 1955, p. 243-246.

Study of steels of three different carbon levels (0.06, 0.23, and 0.29%) shows that tempering heats of from 450 to 650° C. severely reduce corrosion resistance to 3% salt water. Graphs, micrographs. 2 ref. (J29, R4, SS)

207-J. Proper Stock Removal in Finishing Case Hardened Parts. D. F. Hammer. *Steel Processing,* v. 41, Aug. 1955, p. 489-494.

Processes employed for producing hard surfaces on steel and allowances made for stock removal when finishing parts. Micrographs, photograph, graphs, table. (J28, G17, ST)

208-J. The Metallographic View. XIII. Hardenability—The Jominy Test. H. E. Boyer. *Steel Processing,* v. 41, Aug. 1955, p. 501-502.

Use of Jominy test for evaluation of hardenability. Method of preparing specimens for test. Diagrams, graph. (J26, ST)

209-J. Continuous Heat Treating for Automatic Production. W. J. Behrens. *Steel Processing,* v. 41, Aug. 1955, p. 525-529.

Incorporation of heat treating furnaces in the production line to function as a machine tool. Diagrams, photographs. (J general)

210-J. (French.) **Analysis of Pusher-Type Furnaces.** M. Szczeniowski.

Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques, v. 12, no. 8, 1955, p. 1571-1591.

Factors influencing thermal efficiency, analysis of individual factors, selection of the most suitable furnace type for prevailing conditions. Tables, graphs. 7 ref. (J general)

211-J. (Japanese.) **A New Quenching Oil for Spring Steel.** Shigeo Owaku. *Journal of Railway Engineering Research (Japan),* v. 12, no. 9, May 10, 1955, p. 216-221.

Development of a quenching oil with a cooling velocity second only to water and having a long service life. Graphs, tables. (J2, ST, SG-b)

212-J. **Wire Mill Cuts Decarb With Infrared Analyzer.** L. D. Culp. *Automation,* v. 2, Sept. 1955, p. 54-56.

Infra-red analyzer provides continuous record of carbon dioxide content in furnace atmosphere. Photographs, graph, diagram. (J2)

213-J. **Heat Treating: Rx for Better Machinability.** F. J. Robbins and J. J. Lawless. *Iron Age,* v. 176, Sept. 1, 1955, p. 94-97.

Advantages of matching heat treatment with the machining operation. Tables, graph, micrographs. (J general, G17, CN, AY)

214-J. **Ready: Heat Treatable Titanium.** R. G. Sherman and H. D. Kessler. *Steel,* v. 137, Sept. 12, 1955, p. 98-100.

The alloy has high strength, good ductility and excellent elevated temperature strength and stability under stress up to 1000° F. Micrographs, graphs. (J general, Q general, Ti)

215-J. (German.) **Exchange of Experience on Flame Hardening During 1955.** *Metalloberfläche,* Ausgabe B, v. 9, no. 8, Aug. 1955, p. 118-121.

Principles of flame hardening, types of fuel-oxygen mixtures, effect of shape of steel on hardening, causes of defective hardening results, computation of costs, application to various types of repair jobs. Photographs, tables, graphs. (J2, ST)

216-J. (Italian.) **Homogenization of Parts From Cast and Forged Steel.** A. Hencks. *Fonderia,* v. 4, no. 7, July 1955, p. 297-309.

Phenomenon of diffusion, influence of steel composition on the process of homogenization, methods and optimum conditions. Tables, graphs, micrographs. 13 ref. (J21, N1, ST)

217-J. (Russian.) **Method of Determining the Depth of Case Hardening of Alloy Steel by Means of Isothermal Quenching.** M. M. Zamiatnin, Iu. V. El'tsin and B. I. Zviagin. *Zavodskaia Laboratoriia,* v. 21, no. 6, June 1955, p. 687-692.

Determination of carbon on boundary of case hardened layer, selection of temperature of the isothermal media. Conditions of determination (time element). Graphs, micrographs. 2 ref. (J28, J26, AY)

218-J. (Book.) **Heat Treatment of Gray Iron.** C. O. Burgess. 117 p. 1954. Gray Iron Founders' Society, 930 National City—East 6th Bldg., Cleveland 14, Ohio. $5.00.

Describes the successful application of heat treatment to gray iron and indicates how its use can be expanded to make gray iron meet the increasingly stringent demands of modern industry. (J general, CI)

219-J. **A Comparison of the Microstructure and Mechanical Properties of Nodular Irons Ferritized by Two-Stage and Single-Stage Annealing Treatments.** G. N. J. Gilbert. *British Cast Iron Research Association. Journal of Research and Development,* v. 6, Aug. 1955, p. 11-15 + 4 plates.

Subcritical annealing of nodular cast irons gives a sub-boundary structure in the ferrite grains which may result in brittle failure, but can be avoided by annealing above 900°C. Tables, micrographs, photograph. (J23, Q26, CI)

220-J. **Deep Freezing of Aluminum Castings Cuts Machining Costs.** *Canadian Metals,* v. 18, Sept. 1955, p. 40, 42.

Technique fixes metal after heat treatment through relief of internal stresses. Photograph. (J26, G17, Q25, Al)

221-J. **Mechanized Heat Treatment of Grey Iron Castings.** *Canadian Metals,* v. 18, Sept. 1955, p. 46-48.

Continuous, direct gas-fired furnace with cooling chamber anneals and stress-relieves medium strength castings at higher rate and with more uniform results than obtained from two car-bottom type furnaces. Photographs, diagram. (J23, J1, CI)

222-J. **Pros and Cons of Carbon Restoration.** P. M. Unterweiser. *Iron Age,* v. 176, Sept. 8, 1955, p. 71-73.

Reduces machining, salvage scrap, improves a borderline product. Micrographs, photographs, graph. (J26, ST)

223-J. **Heat Treating Copper-Base Alloys.** Arthur I. Heim. *Steel,* v. 137, Sept. 19, 1955, p. 114-117.

Various types of heat treating

and different reasons for using each method. Tables, photographs. (J general, Cu)

224-J. The Optimum Boron Content for Hardenability. J. C. Shyne, E. R. Morgan and D. N. Frey. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 19, 1955, 9 p.

Relationship between boron content and hardenability established for a series of high-purity iron-carbon-boron alloys. Correlation made in terms of "effective" rather than the total boron content. Method for determining effective boron contents. Table, graphs. 7 ref. (J26, ST)

225-J. Investigation of the Heat Treatability of the 6% Aluminum—4% Vanadium Titanium-Base Alloy. R. G. Sherman and H. D. Kessler. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 35, 1955, 19 p.

Heat treatment, stress stability, section size, elevated temperature, tensile, and fatigue studies carried out on material from production ingots. The results show that the alloy is moderately heat treatable; in ½-in. sections, tensile strengths from 130,000 to 175,000 psi. and yield strengths from 100,000 to 165,000 psi. combined with high ductilities may be obtained. Tables, graphs, micrographs. (J general, Q general, Ti)

226-J. Electric Furnace Design for Steel Heat Treatment. A. G. Wallbank. *Australasian Engineer,* 1955, Aug., p. 57-69.

Fundamental requirements and steps taken to satisfy them. Photographs. (J general, ST)

227-J. Large-Scale Continuous Annealing of Coils With Carbon Restoration. *Industrial Heating,* v. 22, Sept. 1955, p. 1770 + 8 pages.

Specialized furnace has six zones of individually controlled temperature, suction-type gas-fired radiant tubes to prevent atmosphere contamination, and recirculating fans to provide temperature uniformity and atmosphere circulation. Photographs, diagram. 4 ref. (J23, ST)

228-J. Fine Grained Phosphor Bronze. *Materials & Methods,* v. 42, Sept. 1955, p. 108-109.

Reducing grain size makes possible extra high finish, improved mechanical properties and corrosion and fatigue resistance. Photographs. (J23, M27, Cu)

229-J. Induction Hardening and Tempering. *Metal Progress,* v. 68, Aug. 15, 1955, p. 107-120.

Deals with selection and control of equipment and metal for commercial hardening and tempering by induction heating. Results of some typical production applications. Tables, graphs, diagrams, photographs. (J2, J26, J29)

230-J. Flame Hardening. *Metal Progress,* v. 68, Aug. 15, 1955, p. 124-131.

Considerations in applying process, (e.g., fuels, equipment, costs, technical details and materials to be treated). Tables, diagrams, graphs. (J2, CI, ST)

231-J. Gas Carburizing. I. Commercial Practice. II. Application of Equilibrium Data. *Metal Progress,* v. 68, Aug. 15, 1955, p. 132-143.

General description of the process; chemistry, physics and process control. Tables, graphs, digaram, photograph, micrographs. (J28, ST)

232-J. Control of Surface Carbon Content in the Heat Treatment of Steel. *Metal Progress,* v. 68, Aug. 15, 1955, p. 144-150.

Accomplished through control of the surrounding furnace atmosphere. Applications, control, and conditions for specific treatments. Graphs, tables, micrographs. (J general, TS, SS, ST)

233-J. Heat Treating Equipment and Procedures. Carl L. Ipsen. *Metal Progress,* v. 68, Sept. 1955, p. 106-109.

Past trends and future prospects. Atmosphere control, induction heating and mechanization have contributed most to improvement of heat treating processes. Future progress is limitless and impossible to predict. Photograph. (J general)

234-J. New Trend in Wire Annealing. *Steel.* v. 137, Oct. 3, 1955, p. 74-75.

Continuous pusher-type furnace turns out almost as much volume as seven bell-type furnaces, in addition to improving product uniformity. Photographs. (J23)

235-J. Rapid Heating of Forging Die Blocks. *Steel Processing,* v. 41, Sept. 1955, p. 576-578.

New, gas-fired process heats four or five times faster than conventional methods. Photographs, graphs. (J general, F22, TS)

236-J. The Metallographic View. XIV. Hardenability. Howard E. Boyer. *Steel Processing,* v. 41, Sept. 1955, p. 586, 597.

Explains hardenability and shows influence of carbon in steel alloys. Graphs. (J26, CN, AY, C)

237-J. Heat Treatment of Air Hardening Alloys on Welding. J. J. B. Rutherford and J. F. Ewing. *Welding Journal,* v. 34, Oct. 1955, p. 476S-483S.

Test program demonstrates need for post-weld heat treatment and influence of preheating temperature on hardness and microstructure. Graphs, micrographs, table. 2 ref. (J general, K general, M27, CN, AY)

238-J. Salt Bath Furnaces for Heat Treatment of Aluminum Alloys. Bernard P. Planner. *Western Machinery and Steel World,* v. 46, Sept. 1955 p. 92-95.

Of great interest to aircraft manufacturers, these furnaces, if properly built and intelligently operated, are safe. Table, graphs, diagrams, photograph. 3 ref. (J2, Al)

239-J. Gas Carburizing Practice. L. G. W. Palethorpe. *Wild-Barfield Heat-Treatment Journal,* v. 5, Sept. 1955, p. 2-7.

Furnace equipment, case depth obtained with drip feed and generator gas atmospheres. Tables, diagram, photographs, micrograph. (J28)

240-J. Influence of Continuous Annealing on the Mechanical Properties of Deep-Drawing Steel Strip With Various Preliminary Treatments. E. Schauff. *Henry Brutcher Translation No.* 3558, 20 p. (From *Stahl und Eisen,* v. 69, no. 2, 1949, p. 49-53.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 18B-52, 1949. (J23, F23, G general, ST)

241-J. (French.) **The Tempering of Cold-Worked Metal by Low-Temperature Annealing.** Aurel Berghezan and Jean Herenguel. *Comptes rendus,* v. 241, no. 5, Aug. 1, 1955, p. 492-494.

Study of the change of structure by rolling and of the mechanical properties by restoration from 225 to 300° C., with an aluminum-magnesium homogeneous solid solution in pure metals with 3% magnesium. Graph. 10 ref. (J23, J29, F23, Q general, Al)

242-J. (French.) **A 450-Kw. Electric Bell Furnace for the Annealing of Steel Bars.** *Journal du Four Electrique,* v. 64, no. 4, July-Aug. 1955, p. 135-137.

Characteristics of the furnace. A homogeneous annealing is obtained without oxidation or decarburization and without loss of material by scaling. Photographs, graph. (J23, ST)

243-J. (German.) **Effect of Activating Additions in Solid Case Hardening Compounds for Cementation of Steels.** Hans Schrader. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 527-533.

Investigates activation effect of oxides and carbonates of alkaline earths and alkali metals in charcoal case hardening compounds. Tables, graphs, 12 ref. (J28, ST)

244-J. (German.) **Steel Castings for Double-Duro Hardening.** Walther Hiller. *Giesserei,* v. 42, no. 18, Sept. 1, 1955, p. 465-466.

Influence of composition of medium carbon steel on the depth of hardening; critical analysis of steels used in Germany for this purpose. Table, graph. 2 ref. (J28, CI)

245-J. (German.) **Hardenability Investigations on Cast Iron.** Rudolf Dicke and Hans Schiffers. *Giesserei,* v. 42, no. 19, Sept. 15, 1955, p. 501-506.

Composition of test pieces and methods of testing, comparison of heating furnaces and burners, temperature and size of graphite used. Diagram, table, photographs, graphs, micrographs. 2 ref. (J26, CI)

246-J. (German.) **Induction Hardening of Large Pieces.** G. W. Seulen. *VDI Zeitschrift,* v. 97, no. 25, Sept. 1, 1955, p. 869-876.

Method, operational instructions, cooling installation, influence of different sizes of installation in the process of hardening. Graphs, diagrams, photographs. 9 ref. (J2, ST)

247-J. Nitriding Improvements. G. Keller. *Brown Boveri Review,* v. 42, No. 3, Mar. 1955, p. 88-93.

Brown Boveri procedures and results. Graphs, micrograph, diagrams, photographs. (J28)

248-J. Design of Special Atmosphere Furnaces and Their Application to Heat-Treatment of Metals. I. Jenkins. *Metal Treatment and Drop Forging,* v. 22, Sept. 1955, p. 369-374.

Design and application of batch furnaces and controlled atmospheres now available in industry. Tables, photographs. (To be continued.) (J2)

249-J. (French.) **Contribution to the Study of the Reproductibility of the Jominy Test.** A. Kohn and G. Delbart. *Revue de métallurgie,* v. 52, no. 8, Aug. 1955, p. 658-667.

Dispersion was due to inadequate correspondence between values obtained with instruments of varying hardness and to inadequate preparation of bar ends or deficient test-piece fixture. Tables, graphs. (J26, ST)

250-J. (German.) **Inductive Heating of Slugs.** K. H. Brokmeier. *Aluminium,*

v. 31, no. 10, Oct. 1955, p. 471-476.

Concentration of energy, furnace dimensions and design, constancy of temperature, energy consumption, heating up period, prime costs. Diagrams, graphs, table, photographs. (J2, Al)

251-J. (German.) **Annealing of Steel Rods in Vacuum.** Odo Felgel-Farnholz, Heribert Sidan and Werner H. Scheibe. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, nos. 7-8, July-Aug. 1955, p. 250-257.

Data of investigation, giving optimum condition for the process. Tables, graphs, photograph. 2 ref. (J23, ST)

252-J. (Polish.) **Up-To-Date Installations for the Annealing of Narrow Strips.** Zygmunt Wusatowski. *Hutnik,* v. 22, nos. 7-8, 1955, p. 258-265.

Use of bell-type and shaft furnaces; bell-type heated electrically; continuous-process normalization and annealing; induction heating. Diagrams. 15 ref. (J23, ST)

253-J. **New Advancements in Hot Salt Quenching.** Q. D. Mehrkam. *Industrial Heating,* v. 22, Oct 1955, p. 1980 + 8 pages.

Austempering and martempering in a nitrate-nitrite salt bath with downward flow. Safe water injection described. Graphs, table. (J2)

254-J. **Optimum Heat Treatment for Magnetic Core Iron.** H. A. Steinherz. *Industrial Heating,* v. 22, Oct. 1955, p. 1992 + 4 pages.

Optimum heat treatment for a particular type of core iron was established using statistical experimental techniques. Application of the results to factory procedure resulted in a 33% improvement in permeability. Tables, photographs. 5 ref. (J general, P16, Fe)

255-J. **Gas as a Source of Protective Atmosphere in Industrial Furnaces.** E. J. Funk. *Industrial Heating,* v. 22, Oct. 1955, p. 2030 + 4 pages.

Endothermic and exothermic type gases for use as protective furnace atmospheres during various heat treating applications. Graphs. (J2)

256-J. **Analyzing Furnace Atmospheres.** Franklin B. Leslie. *Metal Treating,* v. 6, Sept.-Oct. 1955, p. 10 + 5 pages.

Applications of analyzer, for quality control and safety, given for measuring atmospheric composition, purified exothermic gas, endothermic gas, dissociated ammonia, nitriding and gas carburizing. Photographs, tables, graphs. (J2, J28, S11)

257-J. **Heat Treating Gray Iron. I.** *Steel,* v. 137, Oct. 24, 1955, p. 118-120, 122.

Describes stress relief and annealing. Photographs, graphs, table. (J1, J23, CI)

258-J. **Flame Hardening—Modern Methods and Equipment. I.** John E. Hyler. *Steel Processing,* v. 41, Oct. 1955, p. 659-664, 668, 671.

Advantages, procedures. Photographs. (J2)

259-J. **Tempering Chart for Steels Used in Tool Engineering.** *Tool Engineer,* v. 35, Nov. 1955, p. 125-126.

Check list of tempering methods and resulting properties of several brands. Tables. (J29, TS, ST)

260-J. **Freezing Plus Working Makes Stainless Super-Strong.** V. N. Krivobok and C. R. Mayne. *American Machinist,* v. 99, Oct. 24, 1955, p. 152-153.

At subzero temperatures, severe forming and bending are possible and, at the same time, physical properties are improved. Graphs, photographs. (J26, Q23, SS)

261-J. **Heat Treat Controls Boost Job Shop Quality.** W. G. Patton. *Iron Age,* v. 176, Oct. 20, 1955, p. 103-106.

System used by Bosworth Steel Treating Co. keeps production and quality at high levels for broad range of work. Photographs, histogram. (J general, S16, ST)

262-J. **Heat Treating Gray Iron. II.** *Steel,* v. 137, Oct. 31, 1955, p. 76-77, 79.

Reasons for and types of heating, composition and structure, quenching and after treatment. Photograph, table, micrographs. (J general, CI)

263-J. **Progressive Work-Hardening and Re-Annealing of Five Brands of High Conductivity Copper.** M. V. Yokelson and M. Balicki. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1179, 1182-1194, 1285.

Includes photographs, tables, graphs. 4 ref. (J23, Cu)

264-J. (Czech.) **Secondary Hardening of Low-Alloyed Boiler Steels.** Frantisek Kralik. *Hutnické listy,* v. 10, no. 9, Sept. 1955, p. 525-528.

Clarifies reasoning for secondary hardening of chromium-molybdenum, chromium-vanadium and chromium-molybdenum-vanadium steels. Two mechanisms of vanadium carbide precipitation, regarding the creep strength of chromium-vanadium steels, described; functions of vanadium in boiler steels. Graphs. (J29, J27, Q3, AY)

265-J. (French.) **Stabilizing Heat Treatments of Aluminum-5% Magnesium Alloys Against the Effects of Low-Temperature Heating. I.** André Guilhaudis. *Revue de l'aluminium,* v. 32, no. 223, July-Aug. 1955, p. 717-725.

Alloys of the aluminum-magnesium group, even with a magnesium content of 5%, can be sensitized to intercrystalline corrosion by heating them at low temperatures between 70 and 200° C. despite having the highest resistance to corrosion of the light alloys. Stabilizing heat treatments reviewed. Micrographs, graphs, photograph, tables, diagrams. (To be continued.)
(J general, R2, Al)

266-J. (German.) **Investigations on the Effect of Abrupt Temperature Changes on the Surface Finish of Steel.** Wilhelm Rädeker. *Stahl und Eisen,* v. 75, no. 19, Sept. 22, 1955, p. 1252-1263.

Tests from 300 to 1000° C. with up to 250 quenches on round specimens and tubes of basic converter steel and steel used for piercing mandrels. Tables, graphs, diagrams, photographs, micrographs. 5 ref.
(J26, ST)

267-J. (Italian.) **Influence of Heat Treatments on Some Mattes of the Copper-Nickel-Sulfur System.** V. Gottardi. *Metallurgia italiana,* v. 47, no. 9, Sept. 1955, p. 415-420.

Thermal growth of various phases, particularly liquid, has been studied with regard to temperature, time and composition. Diagram, tables, micrographs. 13 ref.
(J general, Cu, Ni)

268-J. (Book.) **Industrial Furnaces.** W. Trinks. v. II. 3rd Ed. 358 p. 1955. John Wiley & Sons, New York, N. Y. $10.00

Fuels and electric energy; combustion devices and heating elements; control of furnace temperature and atmosphere; labor-saving appliances; furnace types; safety measures. (J general)

SECTION K

JOINING

1-K. Mechanization of Argon-Arc Welding. J. P. Crum. *Aircraft Engineering,* v. 26, Oct. 1954, p. 360-364, 366.

Experience with inert-gas-shielded-arc welding of light alloys. Photographs, table, diagrams. (K1, EG-a)

2-K. Adhesive Bonding. George Epstein. *Machine Design,* v. 26, Nov. 1954, p. 217-220.

Bonding procedure, advantages and conditions for joining metals and plastics. Photographs. (K12)

3-K. Argon-Arc Welding. *Aircraft Production,* v. 16, Nov. 1954, p. 430-435.

Development of equipment for mechanized application of tungsten-electrode and consumable-electrode processes. Photographs, tables, diagram. (K1)

4-K. The Riveting of Aluminium. *Aluminium Development Association, Information Bulletin No.* 8, Sept. 1954, 62 p.

Design factors for riveted joints, manufacture of rivets, riveting techniques. Tables, diagrams, photographs. 20 ref. (K13, Al)

5-K. The Glass Sealing Properties of Titanium and Zirconium. H. Rawson and E. P. Denton. *British Journal of Applied Physics,* v. 5, Oct. 1954, p. 352-353.

Thermal expansion characteristics, sealing techniques, strength of seals. Photograph, graphs, diagrams. (K11, Ti, Zr)

6-K. Trends in Modern Shipyard Welding. R. J. W. Rudkin. *British Welding Journal,* v. 1, Nov. 1954, p. 487-494.

Structural design, edge preparation, comparison of machine and hand welding, quality control, prevention of failures and cost reduction. Diagrams, photographs, tables, graphs. 2 ref. (K general, ST)

7-K. Welding in the Aero-Engine Industry. F. G. C. Sandiford. *British Welding Journal,* v. 1, Nov. 1954, p. 495-504.

Organization of production, special equipment and new methods. Diagrams, photographs. (K general, ST)

8-K. Fusion Welding of Aluminium Alloys. IV. Preliminary Tests on High-Strength Heat-Treatable Aluminium Alloys. W. G. Hull and D. F. Adams. *British Welding Journal,* v. 1, Nov. 1954, p. 513-521.

Testing program. Welding characteristics of aluminum-copper alloys. Tables, photographs, graph. 5 ref. (K1, K9, Al, Cu)

9-K. Push Button Pipe Welding With an Automatic Hidden-Arc Technique. E. E. Walden. *Canadian Metals,* v. 12, Nov. 1954, p. 56, 58, 60.

Machine achieves greater penetration, higher quality and better appearance without glare or fumes. Savings of up to 70% of time for manual welding. (K1, CN)

10-K. Automatic Percussion Welding. A. L. Quinlan. *Communication and Electronics,* 1954, Nov., p. 561-565.

Equipment, advantages of process, electrical circuits. Photographs, diagrams, graphs. (K3)

11-K. Adhesive Bonding. Helmut Thielsch. *Materials & Methods,* v. 40, Nov. 1954, p. 113-128.

Types of bonding agents, properties and how they can be altered, applications and manufacturers. Photographs, tables, graphs, diagram. (K12)

12-K. The British Welding Research Association. K. Winterton. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 169-174.

Survey of more important aspects of current work. Photographs. (K general, A9)

13-K. Conducting Primer for Resistance Welding. (Digest of "A New Type of Primer for Resistance Welding", by A. J. Elleman and N. D. P. Smith, paper No. 21, Fourth International Conference on Electrodeposition and Metal Finishing, London, Apr. 23, 1954. *Transactions of the Institute of Metal Finishing, 1954*). *Metal Progress,* v. 66, Nov. 1954, p. 168-170.

Coatings made conductive by addition of metal powders for protecting inner surfaces of spot welded assemblies. (K3, ST)

14-K. Metal-Bonding Adhesives With Improved Heat Resistance. John M. Black and R. F. Blomquist. *Modern Plastics,* v. 32, Dec. 1954, p. 139 + 4 pages.

Progress report on development of adhesives with greater resistance to temperatures up to 600° F. Tables. 7 ref. (K12)

15-K. A New Production Brazing Process. C. A. McFadden. *Modern Metals,* v. 10, Nov. 1954, p. 57-59.

Method of brazing aluminum sheathed nichrome heating elements to aluminum cooking utensils gives 400% increase in heating efficiency. Photographs. (K8, Ni, Al)

16-K. Print—Roll—Inflate. *Modern Metals,* v. 10, Nov. 1954, p. 86, 88.

New roll-bonding process creates maze of tubing from two sheets of aluminum. Photographs, micrograph. (K5, Al)

17-K. The Importance of Design in Welding. H. Gerbeaux. *Sheet Metal Industries,* v. 31, no. 331, Nov. 1954, p. 933-938.

Principles of design of welded structures. Diagrams. (To be continued.) (K general)

18-K. Welded Steelwork for a New Highway Bridge. Alan Heathcote. *Welding and Metal Fabrication,* v. 22, Nov. 1954, p. 408-415.

Welding techniques and sequences. Photographs, diagrams. (K general, T26, CN)

19-K. Mechanization of Argon Arc Welding. *Welding and Metal Fabrication,* v. 22, Nov. 1954, p. 424-429.

Practices for welding aluminum plate. Photographs, diagrams, tables. (K1, Al)

20-K. Metallurgical Principles of Metal Bonding. M. S. Burton. *Welding Journal,* v. 33, Nov. 1954, p. 1051-1057.

Fundamentals of soldering, brazing and welding. Diagrams, micrographs, photograph. (K general)

21-K. Spot Welding Aluminum Alloys With Single-Phase Equipment. J. F. Harris. *Welding Journal,* v. 33, Nov. 1954, p. 1058-1072.

Basic schedule data using a shaped wave form for 12 variations of size and composition. Tables, photographs, graphs, micrographs. (K3, Al)

22-K. Improved Semi-Automatic Welding and Hard Facing. Howard S. Avery, Turner G. Brashear, Jr., Henry J. Chapin and Gerald H. Edmunds. *Welding Journal,* v. 33, Nov. 1954, p. 1073-1079.

New device combines advantages of automatic welding with flexibility of manual welding. Photographs, diagram, tables, graph. 4 ref. (K1)

23-K. Shielded-Inert-Gas Metal-Arc Welding of Carbon Steel. J. R. Craig. *Welding Journal,* v. 33, Nov. 1954, p. 1080-1086.

Application data for successful procedures. Photographs, tables, diagrams. (K1, CN)

24-K. High-Temperature Alloy Fusion Brazing for Titanium and Titanium Alloys. Roger A. Long and Robert R. Ruppender. *Welding Journal,* v. 33, Nov. 1954, p. 1087-1090.

A titanium-nickel-copper-cobalt alloy for furnace brazing titanium. Graphs, photograph, micrograph. 5 ref. (K8, Ti)

25-K. Investigation of Factors Determining the Tensile Strength of Brazed Joints. Nikolajs Bredzs. *Welding Journal,* v. 33, Nov. 1954, p. 545S-563S.

Plastic constraint and strength of base metal are primary factors in strength of properly made brazed joints. Effects of gas inclusions and interface imperfections. Graphs, diagrams, photographs, tables. 15 ref. (K8, Q23, ST)

26-K. Local Buckling of Intermittently Welded Structural Members. C. H. Norris and J. B. Scalzi. *Welding Journal,* v. 33, Nov. 1954, p. 564S-578S.

Test results indicate critical gap-width ratios should be incorporated in specifications. Intermittent welding should not be used in dynamically loaded members. Diagrams, graphs, tables, photographs. 6 ref. (K general, Q28, CN)

27-K. (German.) **Economy of High Efficiency Electrodes.** Hans Hülsewig. *Schweissen und Schneiden,* v. 6, no. 10, Oct. 1954, p. 400-410.

Description, melting rate, costs and mechanical properties of weld metal. Graphs, diagrams, tables, photographs. 6 ref. (K1, Q general, ST)

28-K. (Russian.) **New Type of Glue for Fastening Sheet Polyisobutylene to Metal.** A. P. Pisarenko and R. A. Reznikova. *Legkaia Promyshlennost',* v. 14, no. 10, Oct. 1954, p. 23-26.

Compositions, strength and other properties of glues. Tables, graphs. (K12)

29-K. (Russian.) **Spot Welding of a Heavy Armature.** S. S. Levi. *Mekhanizatsiia Stroitel'stva,* v. 11, no. 10, Oct. 1954, p. 5-9.

Welding procedures, size and strength of weld. Tables, graphs, photograph. (K3, ST)

30-K. (Russian.) **Consumable-Electrode Arc Welding of Stainless Steels in a Medium of Inert Gases.** A. V. Petrov. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 68-70.

Study of welding in argon and helium and properties of the welds obtained. Diagram, photographs, table. (K1, SS)

31-K. (Russian.) **Apparatus for Automatic and Semi-Automatic Welding at the Institute of Electric Welding Named for Academician S. O. Paton of the Academy of Sciences of the Ukrainian SSR.** E. O. Patona AN USSR. B. E. Paton and P. I. Sevbo. *Vestnik Mashinostroeniia,* v. 34, no, 10, Oct. 1954, p. 36-43.

Construction of various automatic welding apparatuses, characteristic types of automatic and semi-automatic welding equipment. Photographs, sketch. (K general)

32-K. Welding for Fabrication. D. C. Martin. *Battelle Technical Review,* v. 3, Dec. 1954, p. 125-128.

Advantages of gas-shielded-arc welding. Improvements in welding electrodes. Present and future applications of welding. Photograph. (K1)

33-K. Carbon Arc Welding of Copper. *Industry and Welding,* v. 27, Dec. 1954, p. 58-63.

Proper welding techniques, joint preparation and metallurgical changes. Tables. (K1, Cu)

34-K. (French.) **Applications of Welding Processes in the Construction of French Railway Rolling Stock.** P. Salmon. *Soudure et Techniques connexes,* v. 8, nos. 9-10, Sept.-Oct. 1954, p. 251-272.

Methods and equipment for welding heavy sections. Diagrams, photographs.
(K general, T23, Al, ST)

35-K. Explosion Bulge Testing of Weldments. W. S. Pellini. *Bureau of Ships Journal,* v. 3, Dec. 1954, p. 8-13.

Test equipment, techniques and evaluation of materials. Photographs, diagrams. (K9, ST)

36-K. Cold Welding Process. W. A. Barnes. *Electrical Manufacturing,* v. 54, Dec. 1954, p. 94-97.

Technique in which high-unit pressures produce a very critical interflow of metal across clean interfaces. Applications for electrical and electronic parts. Photographs. (K5)

37-K. Investigation of Surface Tension in Metal-Bonding Processes. R. L. Rosano and G. Diehl. *Engineers' Digest,* v. 15, Nov. 1954, p. 469-473. (From *La Recherche Aéronautique,* 1954, no. 40, July-Aug., p. 41-49.)

Previously abstracted from original. See item 710-K, 1954. (K12, Al)

38-K. Punched Lugs Provide Rapid, Simple, Inexpensive Joining Method. Federico Strasser. *Iron Age,* v. 174, Dec. 2, 1954, p. 122-123.

Folding and bending is satisfactory for many sheet metal joints. Diagrams. (K13)

39-K. Cast-Weld Construction of High-Alloy Steel Parts. G. J. Gibson. *Product Engineering,* v. 25, Dec. 1954, p. 178-183.

How to take advantage of welding to assure quality castings at minimum cost in the production of complicated designs. Photographs, diagrams, graph, table.
(K general, CI)

40-K. How Design Control Can Save You Money. Rex Cleveland. *Welding Engineer,* v. 39, Dec. 1954, p. 24-27.

Precautions and requirements for designing satisfactory welded structures. Diagrams, tables.
(K general)

41-K. Five Steps for Molten Dip Brazing. Thomas F. Protz. *Welding Engineer,* v. 39, Dec. 1954, p. 28-30.

Techniques for joining aluminum. Photographs. (K8, Al)

42-K. Here's How to End Porous Welds. Helmut Thielsch. *Welding Engineer,* v. 39, Dec. 1954, p. 33-35.

Causes and remedies. Photographs. 3 ref. (K9, ST)

43-K. (French.) **Modern High-Performance Electrodes.** R. J. Mouton. *Ossature métallique,* v. 19, no. 11, Nov. 1954, p. 555-562.

Development, definition and applications. Tables, graph. (K1, AY)

44-K. (French.) **Welding in Passenger Rolling Stock.** M. W. Kerkhofs. *Revue de la soudure (Brussels),* v. 10, no. 3, 1954, p. 123-132.

Studies spot welding of stainless steel in railroad coaches and streetcars. Photographs, diagrams. (K1, SS)

45-K. (French.) **A Process of Welding Joints Between Rails and Austenitic Manganese Steel Rail Fixtures.** C. Hanappe. *Revue de la soudure (Brussels)*, v. 10, no. 3, 1954, p. 133-135.

Use of vertical plates between rail ends. Fatigue strength of joints. Diagrams, micrographs, tables. (K1, Q7, CN, AY)

46-K. (French.) **Use of Oxyacetylene Flame in Connection With Various Welding Processes.** M. Evrard and H. Granjon. *Revue de la soudure (Brussels)*, v. 10, no. 3 1954 p. 136-150.

Grain refinement, degasification; reduction of residual stresses, descaling of and removal of rust from thin pieces before spot welding. Micrographs, tables, diagrams, photographs. (K2, K3, Q25, ST)

47-K. (German.) **The Welding of Copper and Its Alloys.** H. A. Horn. *Metall*, v. 8, nos. 21-22, Nov. 1954, p. 869-873.

Different methods of welding copper and copper alloys. Typical applications. Photographs, micrographs. 14 ref. (K general, Cu)

48-K. (Spanish.) **Processes for Checking Welded Structures. II.** Guillermo Salazar Polanco. *Fusion de Metales*, v. 16, no. 6, Nov.-Dec. 1954, p. 12-16.

Workmanship and tests for qualifying workers, shrinkage, heating processes for decreasing stresses. Diagrams. (To be continued.) (K9, Q25)

49-K. Australian Trends in Pressure Vessel Construction. W. Bernard. *Australasian Engineer*, 1954, Oct., p. 60-64.

Recent welding and cutting techniques, inspection, materials and construction faults. Photographs, diagrams. (K general, T26, CN)

50-K. Faults in Welds: Causes and Cures. W. S. Coates. *Australasian Engineer*, 1954, Oct., p. 83-84.

Where faults occur and how to eliminate them. (K9, ST)

51-K. Soft Soldering Is Still Growing in Fabrication Usage. E. A. Lancaster. *Canadian Metals*, v. 17, Dec. 1954, p. 43-44, 46.

Properties and uses of tin-lead solders. Diagrams, micrographs. (To be continued.) (K7, Sn, Pb)

52-K. Induction Brazing for Quantity Production. D. Warburton Brown. *Welding and Metal Fabrication*, v. 22, Dec. 1954, p. 460-464.

Equipment and techniques used in mass production installations. Diagrams, photographs, tables. (K8)

53-K. Procedure Control as Applied to Automatic Welding Processes. Warner H. Simon. *Welding Journal*, v. 33, Dec. 1954, p. 1149-1161.

Developments and procedure controls to aid in economical and quality production. Graphs, table, photographs. 32 ref. (K general)

54-K. Flash Welding Aluminum to Copper Tubing. W. F. Haessly. *Welding Journal*, v. 33, Dec. 1954, p. 1162-1170.

Procedures for production welding to meet stringent requirements. Diagrams, photographs, micrographs, table. (K3, Cu, Al)

55-K. Welded TV Tower. Robert A. Vaughn. *Welding Journal*, v. 33, Dec. 1954, p. 1175-1178.

High-speed manual shop arc welding in precision jigs simplified erection problems. Diagrams, photographs. (K1, CN)

56-K. Repairing Castings From Coast to Coast. W. H. Lane. *Welding Journal*, v. 33, Dec. 1954, p. 1179-1184.

Experiences of company specializing in repair of cracked and broken cast iron. Photographs. (K general, CI)

57-K. Spot Welds Work Well in Titanium. M. L. Begeman and Frank W. McBee, Jr. *American Machinist*, v. 98, Dec. 20, 1954, p. 98-100.

Conditions for producing sound welds; mechanical properties of joints. Graphs, photographs. 16 ref. (K3, Q general, Ti)

58-K. How to Braze Carbide-Tipped Tools. *American Machinist*, v. 98, Dec. 20, 1954, p. 123.

Detailed steps for various grades and applications. (K8, C-n)

59-K. Mechanized Welding. *Automobile Engineer*, v. 44, Dec. 1954, p. 561-565.

Development of equipment for mechanized application of the consumable electrode and tungsten electrode processes. Photographs, diagrams, tables. (K1, Al)

60-K. Welding Research. *Automobile Engineer*, v. 44, Dec. 1954, p. 569-574.

Metallurgical aspects of the British Welding Research Association on ferrous and nonferrous metals. Photographs, diagrams, micrographs. 13 ref. (K9, EG-a, Fe)

61-K. Consumable Electrode Arc Welding of Magnesium. Paul Klain.

Light Metal Age, v. 11, Dec. 1954, p. 14-17.

Method promises faster welding and lower costs. Photographs, table. (K1, Mg)

62-K. Silver Brazing Titanium Requires Inert Gas Shield; Gives High Joint Strength. Nathan A. Tiner. *Western Metals,* v. 12, Dec. 1954, p. 70-72.

Equipment, techniques, structure of joints. Graph, micrographs, photograph. (K8, Ti, Ag)

63-K. (Pamphlet.) **Investigation of Adhesives: Metal-to-Metal Bonding.** Report PB 111445. 15 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.50.

Use of a resinous-type adhesive, Araldite 115, in place of soft solder may reduce costs by 50% and save tin and lead. (K12)

64-K. Welding of Carbon Steels by the Argonaut Process. H. F. Tremlett and A. W. Stones. *British Welding Journal,* v. 1, Dec. 1954, p. 541-548.

Investigates production of welds free from porosity and strong enough for joining high-quality killed and semikilled mild steels. Photograph, tables, micrograph. (K1, Cu, CN, ST)

65-K. Fusion Welding of Aluminum Alloys. V. A Mathematical Examination of the Effect of Bounding Planes on the Temperature Distribution Due to Welding. Doris K. Roberts and A. A. Wells. *British Welding Journal,* v. 1, Dec. 1954, p. 553-560.

Using the principle of image sources and a numerical method, it is shown that a weld test plate should have a half-width of not less than ten melted widths to give a reasonable approximation to the thermal conditions in an infinite plate. Graphs, table, diagram. 4 ref. (K9, Al)

66-K. Improved Welding Techniques Produce Lighter, Stronger Chain. Harry F. Reid. *Industry & Welding,* v. 28, Jan. 1955, p. 33-35, 68.

Major and minor welding techniques in chain making. Photographs. (K general, CN, AY)

67-K. Production Brazing Aluminum. Charles A. McFadden. *Industry & Welding,* v. 28, Jan. 1955, p. 50-52, 56-57.

New process for joining aluminum-sheathed nichrome coils to appliances; application in the aircraft industry. Photographs. (K8, Al)

68-K. Welding Research for Higher Efficiency, Lower Costs. Orville T. Barnett. *Industry & Welding,* v. 28, Jan. 1955, p. 58, 60-63.

Fundamental and practical projects at Armour Research Foundation include work with recrystallization welding of aluminum; arc and resistance welding of various metals. Photograph. (K1, K3, Al, Ti)

69-K. Advances in Welding in Britain. E. Bishop. *Metal Progress,* v. 67, Jan. 1955, p. 121-125.

Adoption of wartime gains in welding is everywhere evident in Britain. Much interest has been stirred by new concepts in the design of welded structures and the improvement of weldability of high-tensile steels. Among other advances are electrodes that give crack-free deposits, a stitch welder having double the usual welding speed, and the use of twin-cored electrodes to speed manual arc welding. Photographs. (K9, K1, K3, ST)

70-K. Successful Manufacture and Use of All-Austenitic Welding Electrodes. Egon Kauhausen and H. A. Vogels. *Metal Progress,* v. 67, Jan. 1955, p. 129-136.

Evidence for belief that cracks of all kinds, however named, in austenitic welds are due to grain-boundary inclusions. Crack-free welds, heavy and light, all austenitic, are in long, severe service. Electrodes are made of clean 16-13 Cr-Ni-Cb steel, under special electric furnace practice. Deoxidizers may sometimes need to be added to the basic lime-fluorspar coatings. Design and construction should also minimize residual stresses. Tables, photographs, micrographs, graphs. (K1, Q25, SS)

71-K. The Influence of "Joint Design" on "Solderability". G. L. J. Bailey. *Sheet Metal Industries,* v. 32, no. 333, Jan. 1955, p. 47-57; disc., p. 57.

Nature of relationship; evaluation of effects of prior roughening, alloy formation and precipitation from the flux on value of contact angle. Graphs, table, diagrams, micrographs. 3 ref. (K7, Sn, Pb, Cu)

72-K. New Developments in Metal-Ceramic Seals. Harry Bender. *Sylvania Technologist,* v. 8, Jan. 1955, p. 22-26.

Telefunken process, hydride method and "active alloy" technique. Micrographs, table. 33 ref. (K11)

73-K. Bare Wire to "Coilex". D. B. J. Thomas. *Welder,* v. 23, July-Sept. 1954, p. 182-186.

Progress, from use of bare wire

to development and applications of a new continuous extruded electrode for automatic arc welding. Photographs, tables. (K1, CN)

74-K. (German.) **The Danger of Breakage of Welded Structures.** E. Uhlir. *Schweisstechnik,* v. 8, no. 6, June 1954, p. 61-64; nos. 7-8, July-Aug. 1954, p. 77-79.

Theoretical basis; processes for prevention; elimination of stresses; determination of breakage tendency. Graph, micrographs, diagrams. (K general, Q25, CN, Cu, Mo)

75-K. (German.) **Welding Under Protective Gas.** Alfred Schmidt. *Schweisstechnik,* v. 8, no. 6, June 1954, p.64-70.

Type of current for argon-arc welding of aluminum and aluminum alloys; welding of stainless and heat resistant steels; joining with other metals; deposition and spot welding. Tables, photographs. (K general, Al, SS, Mg, Cu, Ag, CI, Cr)

76-K. (German.) **Welding Electrodes.** W. Hummitzsch. *Schweisstechnik,* v. 8, nos. 7-8, July-Aug. 1954, p. 73-77.

High-grade coated electrodes and their characteristics. Graphs, photographs. 5 ref. (K1)

77-K. (German.) **The Effect of Nitrogen in Electric Arc Welds.** Werner Hummitzsch. *Stahl und Eisen,* v. 74, no. 26, Dec. 16, 1954, p. 1723-1730.

Behavior of nitrogen in molten and solid weld metal; effects on mechanical properties. Tables, photographs, graphs, micrographs. 20 ref. (K1, Q general, ST)

78-K. (German.) **Development and Applications of Resistance Butt Welding.** Heinz Neumann. *Schweissen und Schneiden,* v. 6, no. 11, Nov. 1954, p. 439-447.

Differences and applications of flash and pressure butt welding, with possibilities of mechanizing the former. Graphs, diagrams, photographs, spectrograph. (K3, CI, ST, AY, Cu, Al)

79-K. **Rubber-Based Adhesives.** A. A. Round. *Institution of the Rubber Industry, Transactions,* v. 30; *Proceedings,* v. 1, June 1954, p. 72-80.

Natural tack, flexibility of bond and versatility of adherance. (K12)

80-K. **New Heat Resistant Adhesives for Metal Bonding.** George Epstein. *Materials & Methods,* v. 41, Jan. 1955, p. 107-110.

Two compositions suitable for structural applications at temperatures as high as 600° F. Photographs, graph, tables. (K12)

81-K. **Investigation of Adhesives; Metal-to-Metal Bonding.** Jack F. Furrer. *U. S. Department of Commerce, Office of Technical Services,* PB 111445, Jan.-June 1953, 10 p.

Resinous-type adhesives for use in bonding galvanized steel screens to cold rolled shrouds in tail-fin assembly. Tables. (K11, K12, ST)

82-K. (German.) **Joining With Low Heat Consumption. Principles and Applications.** G. M. Blanc. *Giesserei,* v. 41, no. 26, Dec. 23, 1954, p. 700-703.

Fusion welding with the oxyacetylene torch; silver brazing; diffusion phenomena; fluxes; special electrodes; advantages and practical examples. Micrographs, graphs, photographs. (K8, K2, ST, Ag)

83-K. (Russian.) **Toward the Wider Use of Projection Welding.** A. Z. Blitshtein, P. M. Sapov and B. Z. Feldman. *Sel'khozmashina,* 1954, no. 12, Dec., p. 22-25.

Determination of parameters; operation technique; strength of welds. Graphs, diagrams, tables, X-ray diffraction patterns. 1 ref. (K3)

84-K. **Welding of High-Pressure Steam Pipes.** J. G. M. Turnbull. *British Welding Journal,* v. 2, Jan. 1955, p. 19-26.

Reviews nondestructive testing of welds with special reference to gamma radiographic technique. Graphs, diagrams, micrographs, photographs, table. (K general, S13, ST)

85-K. **The Metallurgy of Welding.** J. Hinde. *British Welding Journal,* v. 2, Jan. 1955, p. 26-31.

Important aspects described for people whose connection with welding is not primarily metallurgical. Graph, diagrams. 11 ref. (K general)

86-K. **Fusion Welding of Aluminium Alloys, VI. Development of a Hot-Cracking Test for Light-Alloy Welds.** W. G. Hull, D. F. Adams and H. E. Dixon. *British Welding Journal,* v. 2, Jan. 1955, p. 32-37.

Test weld is laid along an open-ended slot in a rectangular plate; severity of the test varies inversely as the slot length. Tables, diagram, photographs. (K9, Al)

87-K. **Soft Soldering. II-III.** E. A. Lancaster. *Canadian Metals,* v. 18, Jan. 1955, p. 43-44, 46-47; Feb. 1955, p. 48, 50-52.

Soldering techniques and typical applications. Diagram, table, photographs. 8 ref. (K7)

88-K. **Welding the Copper-Base Alloys.** Lester B. Spencer. *Heating,*

Air Conditioning, Sheet Metal Contractor, v. 46, Jan. 1955, p. 124-132.

Modifications of methods used for mild steel. Photograph, tables. (K general, Cu)

89-K. Welding Aluminum. Charles Bruno. *Heating, Air Conditioning, Sheet Metal Contractor*, v. 46, Jan. 1955, p. 136-141.

Although the most weldable metal, it requires special techniques. Tables, photographs. (K general, Al)

90-K. Adhesive Bonded Aircraft Structures. *National Bureau of Standards, Technical News Bulletin*, v. 39, Jan. 1955, p. 11-13.

Since small changes in fabricating process conditions can produce imperfections and since the only tests at this time are destructive, the acceptance of this method is restricted. Photographs. 2 ref. (K12, Al)

91-K. CO_2 Means Cheaper Gas-Shielded Welds. Thomas F. Hruby. *Steel*, v. 136, Jan. 31, 1955, p. 68-70.

Carbon dioxide as a replacement for argon or helium cuts costs up to 70%. Photographs, diagrams, table. (K2, ST)

92-K. (Book.) **International Acetylene Association Proceedings—1948, 1949, and 1950.** 496 p. 1954. International Acetylene Association, New York, N. Y.

A collection of 43 papers covering uses of oxyacetylene flames in welding, cutting, and surface hardening of metals. (K2, G22, J2)

93-K. Brazing and Soldering by Induction Heating. E. S. Goodridge. *Industrial Heating*, v. 22, Jan. 1955, p. 64 + 6 pages.

Advantages include speed, efficiency, uniformity and quality. Photographs, diagram. (K8, K7)

94-K. Rubber-Base Adhesive Overcomes Tough Carbide Bonding Problem. B. L. Schrader. *Iron Age*, v. 175, Feb. 10, 1955, p. 94-96.

Bonding of carbide files to steel backings made possible. Photographs, diagram. (K12, CN, C-n)

95-K. Fortiweld, a New Development in Weldable High-Tensile Steel. II. H. F. Tremlett. *Welding and Metal Fabrication*, v. 23, Jan. 1955, p. 15-20.

Results of metal-arc, argon-arc and oxy-acetylene welding of this steel. Tables. (K1, K2, AY)

96-K. How to Arc Weld the Different Types of Stainless Steels. I. Lester F. Spencer. *Welding Engineer*, v. 40, Feb. 1955, p. 40-44.

Electrodes, methods and carbide precipitation in austenitic types. Photographs, tables. 8 ref. (K1, SS)

97-K. The Toughness of Weldability. William L. Warner. *Welding Journal*, v. 34, Jan. 1955, p. 9-22.

Appropriate evaluation of toughness factor facilitates selection of base metals, welding procedures and quality control tests. Photographs, diagrams, graphs, tables. (K9, ST)

98-K. A Production Application of Inert-Gas-Shielded Metal-Arc Welding of Mild Steel. John L. Lang. *Welding Journal*, v. 34, Jan. 1955, p. 23-29.

Cost and quality factors; control; influence of spatter, arc length, undercut, porosity and proper fixtures. Photographs, diagrams, charts, table. 3 ref. (K1, CN)

99-K. High-Temperature Alloy Brazing of Thin Materials for Jet Engines. Arnold S. Rose and William N. Lewis. *Welding Journal*, v. 34, Jan. 1955, p. 30-39.

Use of boron-nickel-chromium brazing alloy; precautions; applications. Photographs, graphs, micrographs, diagrams, table. 2 ref. (K8, Cr, Ni, SS, AY, CN)

100-K. Stainless Steel—Welding Summary. Helmut Thielsch. *Welding Journal*, v. 34, Jan. 1955, p. 22S-30S.

Effects of alloying elements on welding characteristics; recommendations for electrodes; heat treatments. Tables. 11 ref. (K general, J general, SS)

101-K. Weld Heat-Affected Zones in ½-In. Titanium Alloy Plates. Ernest F. Nippes, John M. Gerken and Bernard W. Schaaf. *Welding Journal*, v. 34, Jan. 1955, p. 31S-49S.

Notch toughness of two alloys as influenced by energy input, initial plate temperature and postheat treatments. Tables, photograph, graphs, micrographs. 4 ref. (K general, Q23, Ti)

102-K. (French.) **Progress Made in the Construction of Light-Alloy Tank Trucks by the Use of Argon-Arc Welding.** R. A. Boccon-Gibod. *Soudure et Techniques connexes*, v. 8, nos. 11-12, Nov.-Dec. 1954, p. 313-321.

Advantages of argon-arc welding. Diagrams, photographs, tables. (K1, Al)

103-K. (German.) **Procedures and Machines for Butt and Flash Welding.** Emil Wegmann. *Schweissen und Schneiden*, v. 6, no. 12, Dec. 1954, p. 494-499.

Procedures and equipment for welding large cross sections, using low-frequency current. Diagrams, photographs, graphs. (K3, ST)

104-K. Sigma Welding for Light Metals. Byron R. Russell. *Light Metal Age,* v. 12, Feb. 1955, p. 10-12, 28.
Advantages and disadvantages in current commercial practice. Photographs. (K1, Al)

105-K. How to Weld Some Wrought High Alloys. R. P. Culbertson. *Materials & Methods,* v. 41, Feb. 1955, p. 98-102.
Characteristics that must be considered in joint design and welding procedures. Tables, photographs, diagrams.
(K general, Ni, Cr, Fe, Co, W, Mo)

106-K. Problems of Adhesion. B. V. Deryagin. *Research,* v. 8, Feb. 1955, p. 70-74. (Condensed from *Vestnik Akademii Nauk SSSR,* v. 7, 1954, p. 30.)
Research on mechanisms and principles of adhesives. Diagrams. 1 ref. (K12)

107-K. Significance of Recent Resistance Welding Research. J. E. Roberts. *Welding and Metal Fabrication,* v. 23, Feb. 1955, p. 64-69.
Developments in spot and projection welding of steel and aluminum. Tables, graph, diagrams, photographs. (To be continued.)
(K3, ST, Al)

108-K. The Macro Etch System of Evaluating Quality of Resistance Welding. D. O. Samuelson and F. G. Harkins. *Welding Journal,* v. 34, Feb. 1955, p. 105-111.
Nondestructive testing technique for quality control of stainless steel spot welds. Photographs, tables, graphs, micrographs. (K3, K9, SS)

109-K. Properties of Welds in Al-Mg-Mn Alloys 5083 and 5086. L. A. Cook, S. L. Channon and A. R. Hard. *Welding Journal,* v. 34, Feb. 1955, p. 112-127.
Welding characteristics and mechanical and physical properties of weld joints. Photographs, tables, graphs. 11. ref.
(K general, Q general, P general, Al, Mg, Mn)

110-K. New Techniques in Inert-Gas-Shielded Metal-Arc Welding. R. W. Tuthill. *Welding Journal,* v. 34, Feb. 1955, p. 137-141.
Techniques for using carbon dioxide as a shielding atmosphere. Photographs, graph, diagram. 5 ref. (K1, CN)

111-K. Brazing Molybdenum for High-Temperature Service. M. I. Jacobson and D. C. Martin. *Welding Journal,* v. 34, Feb. 1955, p. 65S-74S.
Techniques for producing joints for high-temperature service. Tables, graphs, diagrams, photographs, micrographs. (K8, Mo)

112-K. Direct Explosion Tests of Welding Procedures in Ship Plate. G. S. Mikhalapov and W. A. Snelling. *Welding Journal,* v. 34, Feb. 1955, p. 97S-104S.
Data for welds in semi-killed and rimmed steels. Tables, graphs, photograph. 6 ref. (K9, CN)

113-K. (French.) **Study of the Weldability of 37 H. S. Steels. Test Results.** J. Massinon. *Revue de la soudure (Brussels),* v. 10, no. 4, 1954, p. 216-228.
Elastic limit, brittle fracture and aging of eight steel castings. Tables, graphs, diagrams, photographs. (K9, CI)

114-K. (German.) **Welding in Steel Structure.** A. Battig. *Schweisstechnik,* v. 8, no. 11, Nov. 1954, p. 121-127.
Types of welding with special emphasis on bridges. Photographs, drawings. (K general, ST)

115-K. (Spanish.) **Problem of Fracture During Arc Welding of Alloy Steels.** F. Donis Ortiz. *Ciencia y técnica de la Soldadura,* v. 4, no. 20, Sept.-Oct. 1954, 16 p.
Metallographic structures and use of electrodes; preparation of joints; preheating and heat treatment. Graphs, tables, photographs. (To be continued) (K1, J general, AY)

116-K. (Swedish.) **Effects of Electrode Properties on Welding Costs.** E. J. Magnusson. *Svetsaren,* v. 19, nos. 2-3, 1954, p. 23-31, 34-39.
Effects of fusion coefficient, deposition efficiency and amperage on welding speed; formulas for comparing electrodes. Graphs, diagrams, photograph, tables. 13 ref. (K1)

117-K. (Swedish.) **Application of TTT-Diagrams to Determination of Welding Conditions of Hardenable Structural Steel.** Lauri Pietilainen. *Svetsaren,* v. 19, nos. 2-3, 1954, p. 50-58.
Post-heating cycles for welds in alloy steels. Graphs, table, photograph, micrographs. 5 ref.
(K9, N8, AY)

118-K. Welded Structure for the Hunstanton Secondary Modern School. G. H. Smith. *British Welding Journal,* v. 2, Feb. 1955, p. 49-55.
Welding problems in construction of building framework. Diagrams, photographs. (K general, CN)

119-K. Fusion Welding of Aluminium Alloys. VII. Recording Porosity in Aluminium-Alloy Welds. P. T.

Houldcroft and A. A. Smith. *British Welding Journal,* v. 2, Feb. 1955, p. 67-74.

Severity of porosity classification system. Micrographs, diagrams, tables. (K9, Al)

120-K. Weldability of a C-Mn Steel Related to Properties of the Heat-Affected Zone. C. L. M. Cottrell. *British Welding Journal,* v. 2, Feb. 1955, p. 75-80; disc., p. 80.

Effects of temperature and cooling rates on mechanical properties of the heat affected zone. Graphs, tables, micrographs. 10 ref. K9, Q general, AY)

121-K. Mineral Use in Coated Welding Electrodes. Richard M. Stewart. *California Journal of Mines and Geology,* v. 51, Jan. 1955, p. 9-19.

Function of rutile, limestone and other minerals in coatings. Availability and prospects for use of new minerals. Photographs, tables, diagram. 4 ref. (K1)

122-K. Joints Brazed With New Nickel-Base Alloys Exhibit Good Properties. C. V. Foerster and R. C. Kopituk. *Iron Age,* v. 175, Feb. 24, 1955, p. 79-82.

Mechanical properties and corrosion resistance of brazing alloys for heat resistance metals. Table, photographs, graphs. (K8, Q general, R general, Ni, Si, Cr, B)

123-K. How to Arc Weld the Different Types of Stainless Steels. II. Lester F. Spencer. *Welding Engineer,* v. 40, Mar. 1955, p. 32-34.

Effects of welding procedures on structure and properties of ferritic and martensitic types. Photograph, table. 8 ref. (K1, SS)

124-K. Progress in "Koldwelding". W. A. Barnes. *Wire and Wire Products,* v. 30, Feb. 1955, p. 179, 218-220.

Applications of cold welding of aluminum and copper; production tools. Diagrams. (K5, Al, Cu)

125-K. (Book.) **Adhesion and Adhesives. Fundamentals and Practice.** 229 p. 1954. Society of Chemical Industry, 56 Victoria St., London, S.W.1, England. $9.75; John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y.

With the art of adhesion far ahead of the science, 43 papers are presented to show the advancements being made in both cases, with the primary objective of discussing the status of basic knowledge. (K12)

126-K. (Russian.) **Investigation of the Process of Melting Metal During Arc Welding Using Thick Coated Electrodes With High Currents.** A. A. Erokhin. *Svarochnoe Proizvodstvo,* 1955, no. 2, Feb., p. 1-3.

Compares operation under normal conditions and under conditions where rate of welding is up to 60 cm. per min. with a current of 300 amp. Diagrams, graphs. 4 ref. (K1)

127-K. (Russian.) **Investigation of the Metallurgy and Technology of Thermite Welding of Steel 30L.** M. M. Timofeev. *Svarochnoe Proizvodstvo,* 1955, no. 1, Jan., p. 5-8.

Microstructure and mechanical properties of welded cast steel as a function of the aluminum-oxygen ratio in the thermite. Photographs, micrographs, graphs, diagram, table. 4 ref.
(K4, M27, Q general, CI)

128-K. (Russian.) **Melting of Electrode Wire During Automatic Argon-Arc Welding.** A. V. Petrov. *Svarochnoe Proizvodstvo,* 1955, no. 2, Feb., p. 4-7.

Relations between applied current, size of electrode and physical properties of the wire on melting. Diagrams, graphs. 3 ref. (K1)

129-K. (Russian.) **Stability of the Microstructure and Properties of Butt Joints of Austenitic Steel With Pearlitic Steel.** A. S. Gel'man and V. S. Popov. *Svarochnoe Proizvodstvo,* 1955, no. 2, Feb., p. 7-10.

Influence of composition and heat treatment of 26 austenitic and pearlitic high-alloy steels to determine optimum conditions for joining. Tables, diagrams, micrographs.
(K general, Q general, M27, AY)

130-K. (Russian.) **Automatic and Semi-Automatic Welding of Cast Steel Under the Protection of Carbon Dioxide Atmosphere.** V. N. Suslov. *Svarochnoe Proizvodstvo,* 1955, no. 1, Jan., p. 14-17.

Repair of casting defects; properties of weld metal; control of cracking after welding. Graphs, tables, photographs. 2 ref. (K1, CI)

131-K. (Russian.) **Semi-Automatic Equipment PEGSh-1 for Welding Defects in Steel Castings by a Melting Electrode in the Protective Atmosphere of Carbon Dioxide.** L. V. Golub. *Svarochnoe Proizvodstvo,* 1955, no. 1, Jan., p. 17-19.

Descripton of apparatus, its operation and results in practice. Photograph, table, circuit diagram, diagram. (K1, CI)

132-K. Adhesives for Metal Aircraft Structures. K. S. Meakin. *Adhesives & Resins,* v. 3, Jan. 1955, p. 4-7.

Successful application of Redux bonding method. Tables. (K12)

133-K. Spot Welding of Hardenable Steels. A Review of Information Published up to June 1954. H. E. Dixon. *British Welding Journal,* v. 2, Mar. 1955, p. 121-133.

Effect of sheet thickness and composition; recommended welding conditions; appraisal of testing methods. Graphs, tables, diagrams. 24 ref. (K3, ST)

134-K. Arc Welding Costs. A. G. Thompson. *British Welding Journal,* v. 2, Mar. 1955, p. 134-141.

Economic aspects of welding procedures and costs of labor, electrodes and electric power. Tables, diagram. 21 ref. (K1)

135-K. A Single Cycle Timer for Small Spot Welders. G. O. Crowther and L. H. Light. *Electronic Engineering,* v. 27, Mar. 1955, p. 111-114.

Use of timer results in improved welding quality. Welding time is reduced to as short a period as is consistent with the peak power handling capacity of the welding machine. Diagrams. 2 ref. (K3)

136-K. Welding Titanium Without Filler Rod Improves Joint Efficiency. A. V. Levy and Robert Wickham. *Iron Age,* v. 175, Mar. 17, 1955, p. 99-102.

Materials and methods for inert-gas shielded tungsten-arc welding by manual methods. Photographs, tables. (K1, Ti)

137-K. Spot Welds Work Well in Titanium. M. L. Begeman and Frank W. McBee, Jr. *Machinist (London),* v. 99, Feb. 25, 1955, p. 329-331.

Research indicates method is particularly suited for commercially pure titanium. Graphs, photographs, tables. 16 ref. (K3, Ti)

138-K. Adhesive Bonding Properties of Various Metals as Affected by Chemical and Anodizing Treatments of the Surfaces. I. Additional Tests on Anodized Aluminum and on Zinc-Chromate-Primed Magnesium. H. W. Eickner. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1842-A, Feb. 1955, 9 p.

Good joints obtained on surfaces which were not seal treated. Tables. (K12, Al, Mg)

139-K. Significance of Recent Resistance Welding Research. II. J. E. Roberts. *Welding and Metal Fabrication,* v. 23, Mar. 1955, p. 97-102.

Resistance bolt welding; spot welding aluminum alloys; properties of aluminum alloy welds. Tables, diagrams, graphs, photographs. 19 ref. (K3, Al)

140-K. Weld Metal Dilution Effects in the Metal-Arc Welding of Al-Mg-Si Alloys. W. I. Pumphrey. *British Welding Journal,* v. 2, Mar. 1955, p. 93-97.

Extent to which filler metal is diluted by parent metal when using electrodes based on Al-5% Si and Al-10% Si alloy core wires. Micrographs, graphs, table. 4 ref. (K1, Al)

141-K. How to Weld Pot Metal. Harry Kerwin and Keith Kerwin. *Welding Engineer,* v. 40, Apr. 1955, p. 25-27.

Flame welding procedures. Photographs. (K2, Zn)

142-K. Low-Heat Method of Welding Cast Iron. Arthur L. Phillips. *Welding Engineer,* v. 40, Apr. 1955, p. 30-33.

Torch and arc-welding methods. Photographs. (K1, K2, CI)

143-K. Fusion Welding Titanium Without Filler Metal. Alan V. Levy and Robert Wickham. *Welding Engineer,* v. 40, Apr. 1955, p. 38-41.

Gas-shielded arc welding equipment and methods. Photographs, tables. (K1, Ti)

144-K. Brazing Titanium to Titanium and to Mild and Stainless Steels. W. J. Lewis, P. S. Rieppel and C. B. Voldrich. *Wright Air Development Center Materials Laboratory, WADC Technical Report* 52-313, pt. 1, Nov. 1952, 34 p. *U. S. Department of Commerce, Office of Technical Services,* PB 111244.

Procedures and alloys suitable for brazing titanium; most satisfactory alloys for furnace brazing were silver and silver-base alloys; good joints also made by torch brazing. Photographs, tables, micrographs, diagram. (K8, Ti, SS)

145-K. Preventing Weld Cracks in 1100° F. Stainless Piping. R. M. Curran and A. W. Rankin. *Heating, Piping & Air Conditioning,* v. 27, Apr. 1955, p. 116-119.

Welding procedure for type 347 stainless. Table, micrographs, graphs. (K1, SS)

146-K. Welding Type 347 Stainless Steel for 1100° F Turbine Operation. R. M. Curran and A. W. Rankin. *Welding Journal,* v. 34, Mar. 1955, p. 205-213.

Special electrode composition and postweld heat treatment employed to produce welds insensitive to sigma phase embrittlement at service temperatures. Photographs, graphs, micrographs, tables. 10 ref. (K1, SS)

147-K. Automatic Percussion Welding of Telephone Relay Contacts. A. L. Quinlan. *Welding Journal,* v. 34, Mar. 1955, p. 237-240.

Technique proves successful, in this application, with accuracy of location and good weld strength being obtained. Method is useful for high-speed automatic welding; metals of high thermal and electrical conductivity join readily. Photographs, graph, micrograph. (K5)

148-K. Selection of D-C Arc Welding Power Sources. A. U. Welch. *Welding Journal,* v. 34, Mar. 1955, p. 241-245.

Lesser known factors involved in choice of rectifiers vs. motor-generators d.c. arc welders, Oscillograms, photograph. (K1)

149-K. Seam Welding Low-Carbon Steel. M. L. Begeman and Gene C. Walker. *Welding Journal,* v. 34, Mar. 1955, p. 123S-131S.

Development of basic procedure data for fabrication of pressure-tight lap seam-welded joints in low carbon steel sheets. Tables, photographs, micrographs, graphs, radiographs. (K3, CN)

150-K. The Flash Welding of Commercial Molybdenum. I. Temperature Distribution During Parabolic Flashing of ½-In. Sintered-and-Wrought Molybdenum Rods. Ernest F. Nippes and Wen H. Chang. *Welding Journal,* v. 34, Mar. 1955, p.132S-140S.

Experimental results compared with and substantiated by findings of microscopic examination. Micrographs. photograph, diagram, tables, graphs. 11 ref. (K3, Mo)

151-K. (German.) **The Adhesion of Metals.** E. Frischbier and W. Schäfer. *Plaste und Kautschuk,* v. 2, no. 2, Feb. 1955, p. 28-33.

Types and properties of metal adhesives. Photographs, diagrams, graphs. 58 ref. (K12)

152-K. (German.) **Silox Brazing Process for Cast Iron.** Benno Sixt. *Schweisstechnik,* v. 9, no. 1, Jan. 1955, p. 1-5.

Process of joining cast iron with specially developed brass rods and fluxes. Diagrams, photographs, graph. (K8, CI)

153-K. Practical Control in the Welding of Alloy Steels. I. C. Fitch. *British Welding Journal,* v. 2, Apr. 1955, p. 151-158.

Methods of determining whether a steel is weldable; how to establish conditions necessary for welding successfully. Graphs, table, diagrams, photographs. 14 ref. (K9, AY)

154-K. Oxy-Acetylene Pressure Welding of Aircraft Undercarriage Components. D. C. Brown and J. J. Wilson. *British Welding Journal,* v. 2, Apr. 1955, p. 160-171.

Preliminary experimental work leading to production of a large pressure-welded undercarriage. Photographs, diagrams, tables, graphs. 2 ref. (K2)

155-K. Bronze Welding of Steel. E. Ryalls. *British Welding Journal,* v. 2, Apr. 1955, p. 175.

Used to join a variety of similar and dissimilar ferrous and nonferrous metals at a temperature below that of the melting point of the parent metal. Diagrams. (K8, Cu)

156-K. Measurement of Resistance-Welding Variables. J. E. Roberts. *British Welding Journal,* v. 2, Apr. 1955, p. 176-180.

Methods of measuring current, time and electrode force. Diagram, photographs, circuit diagrams. 5 ref. (K3)

157-K. Welding Aluminum. IV. Spot Welding. Charles Bruno. *Heating, Air Conditioning, Sheet Metal Contractor,* v. 46, Apr. 1955, p. 56-63.

Procedures which differ somewhat from conventional methods. Photographs, tables. (K3, Al)

158-K. Mechanized Argon-Arc Welding. G. D. Chapman. *Light Metals,* v. 18, Apr. 1955, p. 115-121.

Analysis of current trends of production equipment selected to cover a broad range of welding operations in aluminum alloys. Tables, photographs, diagram. 6 ref. (K1, Al)

159-K. New Aluminum-Ceramic Bond Produces Hermetic Seal. George W. Hume. *Materials & Methods,* v. 41, Apr. 1955, p. 110-111.

A technique that produces a satisfactory high-temperature seal between ceramic materials and aluminum and its alloys. Photographs, micrographs, table, diagram. (K11, Al)

160-K. Hard Soldering Aluminium. *Metal Industry,* v. 86, Apr. 15, 1955, p. 289.

Process for corrosion resistant medium-temperature work. Photographs. (K7, Al)

161-K. Recent Developments in Rubber-to-Metal Bonding. Howard H. Irvin and William H. Cornell. *Rubber World,* v. 132, Apr. 1955, p. 55-61.

A new system, effective in bonding the most widely used elastomers, is insensitive to disturbing varia-

tions in atmospheric conditions, and is effective for bonding at high temperatures with short curing cycles. Tables, diagram, graphs, photographs. (K11)

162-K. Projection Welding. Ralph H. Eshelman. *Tool Engineer,* v. 34, May 1955, p. 109-118.

Adaptability of automatic assembly to production and other applications. Photographs, diagrams, tables. (K3)

163-K. Automatic Arc Welding. J. A. Lucey. *Welding and Metal Fabrication,* v. 23, Apr. 1955, p. 116-121.

Advantages and field of application. Photographs, tables. (K1)

164-K. Automatic Sigma Welding. D. B. Tait. *Welding and Metal Fabrication,* v. 23, Apr. 1955, p. 127-129.

Weld is protected from atmospheric oxidation by shield of inert gas. Photographs, graph. (K1)

165-K. (French.) **Temperature of Transition of Brittleness, Criterion of Quality of Arc Welding Electrodes.** Daniel Sérian and Marcel Moneyron. *Revue de métallurgie,* v. 52, no. 3, Mar. 1955, p. 219-236; disc., p. 236.

Effect of electrode coating upon transition temperature. Tables, graphs, micrographs, diagrams. 17 ref. (K1, Q23)

166-K. (German and French.) **Current Brazing Problems.** Jakob Colbus. *Zeitschrift für Schweisstechnik,* v. 45, no. 2, Feb. 1955, p. 27-35.

Review of brazing research in Switzerland. Diagrams, micrographs, graphs, table. 8 ref. (K8)

167-K. (German.) **Contribution to the Formation of Titanium Nitrides in Welds of Rutile Type Coated Electrodes.** W. Hummitzsch and L. Hense. *Schweissen und Schneiden,* v. 7, no. 3, Mar. 1955, p. 79-85.

Improving influence of special nitrides on quality of welds. Tables, graphs. 6 ref. (K1)

168-K. (German.) **Examples of Application of the Silox Soldering Process.** Benno Sixt. *Schweisstechnik,* v. 9, no. 2, Feb. 1955, p. 17-20.

Methods and advantages of soldering gray iron castings. Photographs. (K7, CI)

169-K. (German.) **Modern Metal Joining Using Glue and Its Strength.** E. W. Pleines. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 160-171.

Technique of operation and importance of the method, particularly for light alloys. Drawings, tables, stress pattern, photographs. 11 ref. (K12, EG)

170-K. (Russian.) **Welding of High-Strength Cast Iron Containing Spheroidal Graphite.** V. V. Bazhenov, L. M. Iarovinskii, and A. D. Kuznetsova. *Svarochnoe Proizvodstvo,* 1955, no. 3, Mar., p. 1-5.

Variation of cast iron hardness with quenching at different temperatures; mechanical properties of welded seams and their microstructure when iron-nickel and other electrodes are used; effect of heat treatment. Graph, tables, micrographs. 5 ref. (K1, CI)

171-K. (Russian.) **Welding of Pipes Consisting of Two Layers, One of Which is Rust-Proof.** N. Iu. Pal'chuk. *Svarochnoe Proizvodstvo,* 1955, no. 3, Mar., p. 5-7.

Problems involved and types of welding recommended. Tables, photographs, micrographs, diagram. 2 ref. (K general, ST)

172-K. (Russian.) **Welding of Pipes of Heat-Resistant Chromium-Molybdenum Steel 12 X 5MA.** L. S. Livshits, A. G. Mazel', M. Ia. Chushenkova and L. P. Bakhrakh. *Svarochnoe Proizvodstvo,* 1955, no. 3, Mar., p. 8-10.

Types of electrodes used; condition and pre-treatment of welded parts; microstructure of welded zone. Micrographs, tables. (K1, M27, AY)

173-K. (Russian.) **Experiment in the Automatic Welding of Two-Layer Steel Vessels.** F. S. Bugrii. *Svarochnoe Proizvodstvo,* 1955, no. 3, Mar., p. 16-18.

Techniques for fusing the rust resistant steel seam into the low carbon steel. Photographs, diagrams, micrographs. 2 ref. (K1, SS, CN)

174-K. (Russian.) **Electric Arc Welding of Lead and Aluminum Bronzes and of Siliceous Brass.** I. P. Doronin and V. M. Sventitskii. *Svarochnoe Proizvodstvo,* 1955, no. 3, Mar., p. 18-21.

Types of electrodes, weld thicknesses, conditions, chemical composition of bronzes and brasses, microstructure. Micrograph, photographs, tables. 3 ref. (K1, Al, Cu, Pb, Mn, Zn, Fe, Sn)

175-K. (Spanish.) **Contribution to the Problem of Nonmetallic Inclusions in Deposited Metal.** J. M. Sistiaga and W. Koch. *Ciencia y técnica de la Soldadura,* v. 4, no. 21, Nov.-Dec. 1954, 7 p.

Study of deoxidation processes in deposited metal in the electric arc welding of carbon steels. Chemical and morphological examination of

nonmetallic inclusions. Tables, diagram, graph, micrographs. 9 ref. (K1, CN)

176-K. (Spanish.) **Electric Projection Welding.** Evert H. Bykin. *Ciencia y técnica de la Soldadura,* v. 4, no. 21, Nov.-Dec. 1954, 13 p.

Factors and conditions that contribute to good results from electric resistance welding; equipment used and possible applications. Diagrams, graphs. (K3)

177-K. (Spanish.) **Problem of Cracking During the Arc Welding of Alloy Steels.** F. Donis Ortiz. *Ciencia y técnica de la Soldadura,* v. 4, no. 21, Nov.-Dec. 1954, 10 p.

Study of metallographic structures, uses of adequate electrodes, preparation of joints, preheating and heat treatments in examination of cracking in nickel and manganese steels. Graphs, micrograph. (K1, AY)

178-K. Hard Soldering. W. J. Smellie. *Aircraft Production,* v. 17, May 1955, p. 181-185.

Methods for joining aluminum by heating the suitably prepared surface and applying to it solder or brazing-alloy in the molten condition. Unlike welding, no fusion of parent aluminum is involved. Photographs, micrographs, tables, diagrams. 4 ref. (K7, Al)

179-K. Are You Ready to Weld Titanium? Orville T. Barnett. *Industry & Welding,* v. 28, May 1955, p. 63 + 6 pages.

Inert-gas metal-arc welding and resistance welding described. Atmosphere contamination, joining techniques and choice of inert atmosphere are discussed. Table. (K1, K3, Ti)

180-K. Wrought Carbon and Alloy Steel: Weldability. Helmut Thielsch. *Machine Design,* v. 27, May 1955, p. 166-172.

Evaluation of effects of variations in welding processes and materials. Recommended welding procedures. Photographs, tables. (K9, LN, AY)

181-K. Hidden-Arc Welding Improves Reel Design. *Modern Machine Shop,* v. 27, May 1955, p. 124-127.

Design and fabricating angle employed in producing large dresser reels for the textile industry. Photographs. (K1)

182-K. What's Ahead for Titanium Fasteners. James B. Duke. *Modern Metals,* v. 11, Apr. 1955, p. 46 + 3 pages.

Progress made in developing titanium aircraft locknuts. Problems remaining to be solved before the weight saving advantages of such parts can be realized at reasonable costs. Tables, photographs. (K13, Ti)

183-K. Old Gas—New Application. T. B. Jefferson. *Welding Engineer,* v. 40, May 1955, p. 36-38.

With the addition of carbon dioxide, the Mig welding process now employs three inert gases. But because carbon dioxide is so much cheaper, it may soon overtake argon and helium in the popularity race. Table, photographs, graphs. (K1)

184-K. Low-Heat Welding of Cast Iron. Arthur L. Phillips. *Welding Engineer,* v. 40, May 1955, p. 47-48, 57.

Quickest and most economical and satisfactory method of joining or repairing castings. Photographs. (K1)

185-K. The Heat-Affected Zone in Arc-Welded Type 347 Stainless Steel. E. F. Nippes, H. Wawrousek and W. L. Fleischmann. *Welding Journal,* v. 34, Apr. 1955, p. 169S-179S.

An investigation to establish the properties of Type 347 in regions adjacent to arc welds to determine the effect of these properties upon the behavior of weldments at elevated temperatures. Photographs, tables, oscillograph, graphs, diagram, micrographs. 17 ref. (K1, SS)

186-K. Welding Procedure Qualification Tests for Six High-Yield-Strength Steels. A. P. Bunk. *Welding Journal,* v. 34, Apr. 1955, p. 197S-206S.

Qualification procedure tests to establish suitable welding procedures for six high-strength pressure-vessel steels. Diagrams, tables, photographs. 2 ref. (K9, ST)

187-K. Recent Developments on Contact Electrodes. D. L. Mathias. *Welding Journal,* v. 34, Apr. 1955, p. 316-328.

Characteristics of the contact electrode offer possibilities for cost reduction through increased deposition rate, reduced cleaning costs and greater welder appeal. Photograph, tables, diagrams, graphs. 3 ref. (K1)

188-K. An Improved Method of Oxy-Fuel Combustion. E. H. Roper. *Welding Journal,* v. 34, Apr. 1955, p. 337-344.

Higher heat release and higher gas velocity than previously used commercially reported for improved type oxy-fuel gas burner. New concepts of welding, cutting, flame hardening and descaling. Diagrams, photographs, tables. (K2, G22, J2)

189-K. On the Mechanism of Starting the Arc in Electric Welding. M.

Ya. Broun and G. I. Pogodin-Alekseev. *Henry Brutcher Translation No*. 2892, 6 p. (From *Avtogennoe Delo,* v. 22, no. 8, 1951, p. 16-17.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 373-K, 1952. (K1)

190-K. (German.) **Fusion Welding of Malleable Aluminum Materials.** H. A. Horn. *Metall,* v. 9, nos. 7-8, Apr. 1955, p. 283-287.

Characteristics of the aluminum welding process; techniques and applications. Tables, diagrams, photographs. 4 ref. (K1, Al)

191-K. (Book—German.) **Materials and Welding. Handbook on Materials and Techniques of Welding.** Friedrich Erdmann-Jesnitzer, editor. v. II. 617 p. 1954. Akademie-Verlag, 39 Mohrenstrasse, Berlin, Germany. $10.00

Welding methods for ferrous and nonferrous metals and alloys; post-welding heat treatment; testing procedures; structure and property changes. (K general)

192-K. Butt-Welding Rings for Gas Turbines. *Machinery (London),* v. 86, Apr. 29, 1955, p. 919-924.

Lengths of extruded sections are formed into rings by conventional methods in preparation for the flash butt welding operation. Photographs. (K3, SS)

193-K. Welding Cracks in Columbium-Bearing Stainless Steel. *Metal Progress,* v. 67, May 1955, p. 109-111.

Modifications in welding rod and base metal compositions and improved welding techniques have considerably reduced their occurrence. Micrographs. 1 ref. (K1, SS)

194-K. Weldability of Low-Alloy Vanadium Steels. (Digest of "Weldability of Twelve Low-Alloy Steels Containing Vanadium," by B. J. Bradstreet; *Welding Research,* v. 7, Oct. 1953, p. 107r-110r.) *Metal Progress,* v. 67, May 1955, p. 180, 182, 184.

Previously abstracted from original. See item 41-K, 1954. (K9, AY)

195-K. (French.) **Examination of Some Problems Raised by the Arc Welding of Large Soft Steel and Alloy Steel Pieces in the Construction of Modern Machines.** A. Lüthy. *Revue de la soudure (Brussels),* v. 11, no. 1, 1955, p. 1-15.

Preparation and assembling of pieces before welding; heat treatments before, during and after welding; electrodes; control of welded heads. Photographs, micrographs. (K1, J general, AY, ST)

196-K. (German.) **Investigation of Adhesive-Bonding of Metals.** G. Kaliske. *Aluminium,* v. 31, no. 4, Apr. 1955, p. 151-156.

Effect of degree of overlap, tensile strength of sheet, its thickness and surface condition, width of test specimens on bonding strength; corrosion resistance, tensile and fatigue strength under stress cycling of the bonds; nature of the hardened adhesive. Graphs. 30 ref. (K12)

197-K. (Russian.) **Cold Welding of Aluminum and Copper Conductors.** K. K. Khrenov and G. P. Sakhatskii. *Svarochnoe Proizvodstvo,* 1955, no. 4, Apr., p. 1-4.

Instruments and techniques; strength properties of cold welds. Photographs, diagrams, table. (K5, Q23, Al, Cu)

198-K. (Russian.) **Resistance Welding of Pipes in a Protective (Gas) Medium.** N. S. Kabanov. *Svarochnoe Proizvodstvo,* 1955, no. 4, Apr., p. 5-9.

Microstructure and strength properties of welds. Tables, diagram, micrographs. 3 ref. (K3, M27, ST)

199-K. (Russian.) **Formation of Pores During Welding, by a Melting Electrode, in Protective Gases.** N. M. Novozhilov. *Svarochnoe Proizvodstvo,* 1955, no. 4, Apr., p. 9-13.

Rust was found to be the cause of pore formation. Tables, chart, photographs. 7 ref. (K1, ST)

200-K. Adhesives and Adhesive Bonding of Metals and Plastics. II. George Epstein. *Adhesives & Resins,* v. 3, Mar. 1955, p. 64-72.

Adhesives in sandwich construction; adhesive bonding, procedures and requirements. Photographs, table. 3 ref. (K11)

201-K. Hard Soldering. R. C. Jewell. *Automobile Engineer,* v. 45, May 1955, p. 213-216.

Thesscal process for aluminum and aluminum alloys. Photographs, tables. (K7, Al)

202-K. A Further Examination of the Welding and Tensile Properties of Some Al-Zn-Mg Alloys Containing Copper. W. I. Pumphrey and D. C. Moore. *British Welding Journal,* v. 2, May 1955, p. 206-215.

Extent of the heat-affected zones produced by oxy-acetylene and argon-arc welding in fully heat treated alloys; effect on weld cracking using filler-rod alloys. Tables, photographs, graphs. 6 ref. (K1, K2, Q23, Al, Zn, Cu, Mg)

203-K. A High Temperature Structural Adhesive. S. E. Susman. *Society of the Plastics Industry, Reinforced Plastics Division, Ninth Annual Technical & Management Conference, Proceedings,* 1954, sec. 7-I, 10 p.

Physical properties and versatility of the resulting adhesive in processing and application to production materials and use. Table, diagrams, graphs, photographs.
(K12, P general)

204-K. Applications of Argonaut Welding to Carbon Steel. R. L. Fannon and V. C. Herbert. *Welding and Metal Fabrication,* v. 23, May 1955, p. 161-165.

Development of a suitable filler wire and gas mixture; welding technique for use on certain grades of killed and semi-killed mild steel. Radiographs, micrographs, photographs. (K1, CN)

205-K. Stainless Steel Fabrication Saves £350,000. Thomas A. Dickinson. *Welding and Metal Fabrication,* v. 23, May 1955, p. 166-168.

Use of inert gas-shielded arc welding equipment for fabrication of stainless steel rings. Photographs, diagrams. (K1, SS)

206-K. Welding Developments in Germany. I. C. Fritz. *Welding and Metal Fabrication,* v. 23, May 1955, p. 169-176.

Growth of welding practices in recent years. Photographs.
(K general)

207-K. Hard Soldering of Aluminium and Aluminium Alloys by the Thesscal Process. R. C. Jewell. *Welding and Metal Fabrication,* v. 23, May 1955, p. 179-182.

Improved method of joining, not involving fusion of the parent metal, to fill the gap between the existing methods of soft soldering operating at 250° C. or less, and brazing operating at approximately 600° C. Photographs, tables. (K7, Al)

208-K. Hardenability Evaluation of Welding Electrodes. Leo M. West. *Welding Journal,* v. 34, May 1955, p. 399-404.

Evaluation of mechanical properties of alloy steel weld deposits after heat treatment. Photographs, graphs, diagrams, tables.
(K1, Q29, AY)

209-K. Semi-Automatic Multiple Flame Brazing Larger Brass Electronic Components. J. W. Weyers. *Welding Journal,* v. 34, May 1955, p. 405-412.

Equipment and methods for brazing rectangular brass tubing to heavy brass flanges. Photographs, graphs, diagrams. (K8, Cu)

210-K. Fusion Welding Unalloyed Titanium Sheet Without Filler Rod. Alan V. Levy and Robert Wickham. *Welding Journal,* v. 34, May 1955, p. 413-419.

Welding procedures and equipment; properties of welds. Photographs, tables. (K1, Ti)

211-K. Oscillographic Instruments in Spot Welding Quality Control and Maintenance. Glenn Woodmancy. *Welding Journal,* v. 34, May 1955, p. 425-432.

Cathode-ray oscilloscope and direct writing magnetic oscillograph are useful and necessary tools for welder maintenance under a high requirement quality control program. Photographs, graphs. 8 ref. (K3)

212-K. Iron-Powder Electrodes—A Progress Report. Jerry Hinkel. *Welding Journal,* v. 34, May 1955, p. 440-445.

Review of first year's history of iron-powder electrodes and summary of the experience that has been gained since their introduction. Photographs, diagrams. (K1)

213-K. Further Studies of the Flash Welding of Steels. E. F. Nippes, W. F. Savage, G. Grotke and S. M. Robelotto. *Welding Journal,* v. 34, May 1955, p. 223S-240S.

Weld centerline rates of cooling at 900, 1000 and 1300° F. in flash welds in AISI 1020 and 4340 steels, prepared under similar conditions, measured and compared. Cooling rate is not influenced by the composition of the steel if the specimen geometry, platen acceleration, and final clamping distance are maintained constant. Tables, graphs. 11 ref. (K3, AY)

214-K. The Flash Welding of Commercial Molybdenum. II. E. F. Nippes and W. H. Chang. *Welding Journal,* v. 34, May 1955, p. 251S-264S.

Production and testing of flash welds of molybdenum; optimum values of upset distance assists in eliminating entrapped oxide in arc-cast and sintered molybdenum and reduces carbide precipitation in arc-cast molybdenum. Special consideration is needed for the higher carbon arc-cast molybdenum. Micrographs, photographs, tables, diagram, graphs. 4 ref. (K3, Mo)

215-K. (Dutch.) **High-Frequency Welding Machine.** K. K. Zwart. *Smit Mededelingen,* v. 10, no. 1, Jan.-Mar. 1955, p. 7-15.

Machine includes high-frequency apparatus to prevent extinction of the arc. Diagrams, graphs, table. (K1)

216-K. (French.) **Welding of Light Alloys in Automotive Production (Application to the 1954 Dyna-Panhard).**

A. Bernier. *Soudage et Techniques Connexes,* v. 9, nos. 1-2, Jan.-Feb. 1955, p. 17-31.

Welding of aluminum-3% magnesium alloy used for car bodies under conditions of mass production. Methods and installation. Tables, diagrams, photographs.
(K general, Al)

217-K. (Hungarian.) **Investigation of the Solders of the Silver-Copper Group.** Ilona Waldhauser. *Kohaszati Lapok,* v. 10, no. 4, Apr. 1955, p. 176-180.

Properties of solders used in vacuum technology; microscopic investigation of their structure in the cast state. Micrographs, graphs, tables. (K7, SG-f, Ag, Cu)

218-K. The Athyweld Process. *Edgar Allen News,* v. 34, May 1955, p. 97-101.

Method of atomic hydrogen welding of toolsteel which permits close carbon control. Diagrams, photograph. (K1, TS)

219-K. Welding Methods and Acid Resisting Alloys Used in Germany. (Review of "Recent Welding Developments in Apparatus and Tank Construction", by H. Engstler; "The Acid Resistance of Low-Nickel, High-Chromium Alloys With Molybdenum and Copper Additions", by W. Tofaute and H. J. Rocha; "Welding in Modern Shipbuilding", by K. Holand; *Technische Mitteilungen Krupp,* v. 3, June 1954.) *Metal Progress,* v. 67, June 1955, p. 194, 196, 198.

Review of progress in welding; covers submerged-arc welding practices and the economies that can be obtained from the higher metal deposition this process offers over manual welding with covered electrodes. (K1, SS)

220-K. Latest in Butt-Welding. Long Rails by Flash Process. *Railway Age,* v. 138, June 6, 1955, p. 26-29.

Technique developed in Europe for fabrication of continuous rail has been adapted for use here and is now producing welds on the Santa Fe. Photographs, diagram. (K3)

221-K. Tecumseh Uses Silver Alloy Brazing for Quality, Mass Production Joining. Victor Humble. *Refrigerating Engineering,* v. 63, May 1955, p. 46-49. 121.

The range, variety and adaptability of the process. Photographs.
(K8, Ag)

222-K. Spot Welding of High-Tensile Steels. P. Joumat. *Sheet Metal Industries,* v. 32, no. 337, May 1955, p. 357-360.

Method for determining settings of resistance welding machines. Diagrams, photographs. 2 ref. (K3, AY)

223-K. An Examination of Fusion-Welding Processes Suitable for Vitreous Enamelling. B. Trehearne. *Sheet Metal Industries,* v. 32, no. 337, May 1955, p. 361-362.

Methods of welding examined were metallic arc, argon arc, oxy-acetylene and atomic hydrogen. Table. 2 ref. (K1, K2, L27)

224-K. High-Strength, Butt-Brazed Joints. Orville T. Barnett and Nikolajs Bredzs. *Steel,* v. 136, May 23, 1955, p. 114, 117.

Technique gives pure silver filler metal a tensile strength of 84,000 psi. before failing. Photograph, graph. (K8, Q23)

225-K. Resistance Welding May be the Answer. Thomas F. Hruby. *Steel,* v. 136, May 30, 1955, p. 70-72.

Advantages and applications of spot, projection, flash and seam welding. Photographs. (K3)

226-K. New Record for All-Welded Construction. W. L. Doherty. *Steel,* v. 136, May 30, 1955, p. 74-75.

Applications, advantages, and methods of hidden-arc welding in fabrication of buildings, bridges and other structures. Photographs.
(K1, T25)

227-K. Tig Welding With a CO_2 Shield. Edward J. Vogel and D. F. Zimmerman. *Welding Engineer,* v. 40, June 1955, p. 28-29, 62.

Report on tests wherein CO_2 was used as an additional shielding medium in the tungsten-inert gas method. Diagram, photograph, table.
(K1)

228-K. Filler Metals for Joining. Orville T. Barnett. *Welding Engineer,* v. 40, June 1955, p. 30-32.

Discussion of the E6010 electrode group. Photograph, diagrams, tables. 2 ref. (K1)

229-K. Welding Brass Strip. Arthur I. Heim. *Welding Engineer,* v. 40, June 1955, p. 34-37.

Progress report on procedures used commercially. (K general, Cu)

230-K. Resistance Welding for the Wire Worker. III. R. H. Jordan. *Wire Industry,* v. 22, May 1955, p. 489-490, 492.

Some aspects of resistance welding as used in wire goods production. Photographs. (K3)

231-K. (French.) **Welding of Clad Steels.** L. F. Denaro and J. Hinde. *Soudage et Techniques connexes,* v. 9,

nos. 3-4, Mar.-Apr. 1955, p. 63-76; disc., p. 76-80.

Methods adaptable for nickel, monel, inconel, austenitic and chromium clad steels. Heat treatment precautions. Tables, diagrams, schematic drawings, photographs. 16 ref. (K general, J general, L22, ST)

232-K. (French.). **Construction of Welded Condensers and Exchangers.** R. Piéplu. *Soudage et Techniques connexes,* v. 9, nos. 3-4, Mar.-Apr. 1955, p. 91-96.

Materials, method of welding, and examples. Tables, photographs. (K general)

233-K. (French.) **Spot Welding of High-Strength Steel.** P. Joumat. *Soudage et Techniques connexes,* v. 9, nos. 3-4, Mar.-Apr. 1955, p. 97-100.

Method for determining the regulation of resistance welding machines. Drawing, photographs, charts. (K3, AY-n)

234-K. (Russian.) **Increasing the Strength of Welded Cylindrical Reservoirs.** A. S. Fal'kevich. *Neftianoe Khoziaistvo,* v. 3, no. 5, May 1955, p. 69-77.

Types of cracking and failures; types of welding recommended for new and in-service tanks. Diagrams, graph, photograph, table. (K general, Q23)

235-K. (Russian.) **Investigation of the Contact Butt-Welding of Cast Iron.** I. R. Patskevich and V. M. Shakhmatov. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 1-4.

Flash welding, with and without preheating, according to several procedures. Microstructure (martensitic-austenitic, pearlitic, etc.) in and beyond weld area; inclusions. Mechanical properties. Tables, micrographs, graph. (K1, M27, Q general, CI)

236-K. (Russian.) **Shielded Metal-Arc One-Pass Welding of Longitudinal and Circular Seams of Boiler Drums.** I. D. Davydenko. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 11-13.

Techniques. Type of current, thickness of electrode wire and amount melted, strength of welding current. Flux fosters formation of protective slag covering. Diagrams, table. (K1, ST)

237-K. (Russian.) **Welded-Cast Assemblies of a Steam Turbine.** S. I. German. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 14-16.

Welding techniques for the correction of casting defects in thick-walls of cast parts of complex configuration. Conditions of heat treatment during welding. Fluxes used. Mechanical properties and microstructures. Graphs, micrographs, photographs, table. (K general, J general, M27, Q general, ST, AY)

238-K. (Russian.) **Use of Welding to Repair the Cylinders of Powerful Hydraulic Presses.** K. P. Voshchanov. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 16-20.

Techniques for repair of casting defects and cracks developed in service. Equipment for preheating and building up of deposits. Diameter of electrode and current strength prescribed for the several layers to be welded. Diagrams, tables, graph, photograph. (K1, CN)

239-K. (Russian.) **Problem of the Depth of Weld Penetration in Manual Welding.** A. S. Chesnokov. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 24-27.

Calculation of factors in electric arc welding including electrode diameters, current strength, seam parameters. Problem of T-shaped welds. Composition of weld. Mechanical properties. Graphs, tables, diagrams. (K1, Q general, ST)

240-K. (Spanish.) **Cast Iron and Its Welding.** Salvador M. Checa Casajus. *Ciencia y técnica de la Soldadura,* v. 5, no. 22, Feb. 1955, 14 p.

Physico-chemical aspect of the fusion; influence of certain chemical elements; types of welding and optimum conditions. Graphs, tables, diagrams. (K general, CI)

241-K. (Spanish.) **Flash Welding.** Evert H. Bylin. *Ciencia y técnica de la Soldadura,* v. 5, no. 22, Feb. 1955, 13 p.

Influence of different factors on the quality of the welding joint; fields of application. Diagrams, graphs. (K3)

242-K. (Spanish.) **Welding With Austenitic Alloyed Steel Electrodes.** M. de Miro and J. L. Zuloaga. *Ciencia y técnica de la Soldadura,* v. 5, no. 22, Feb. 1955, 9 p.

Mechanical properties of welded seams; composition of the electrodes. Tables, micrographs, diagrams. (K1, AY)

243-K. **Structural Spotwelding.** William R. Cain. *Aircraft Production,* v. 17, June 1955, p. 242-247.

Applications in airframe manufacture to large fuselage skin-panels and floor structures. Graphs, photographs, table, diagrams. 3 ref. (K3, Al)

244-K. Carbon Dioxide—Will it Replace Argon and Helium for Inert Arc Welding? *Industry & Welding,* v. 28, June 1955, p. 59-61, 94.

Cost comparisons and the use of carbon dioxide in conjunction with argon. Photograph, diagram. (K1)

245-K. Titanium Can Be Brazed and Soldered. Orville T. Barnett. *Industry & Welding,* v. 28, June 1955, p. 62-66.

Methods of brazing and soldering, fluxes, heating time and temperatures. Photographs, tables. (K8, K7, Ti)

246-K. How and Where to Use Spot Welding. *Industry & Welding,* v. 28, June 1955, p. 71-74, 76.

Comprehensive practical information on spot welding. Includes step-by-step instructions. Diagrams. (K3)

247-K. The DC Rectifier Arc Welder. *Industry & Welding,* v. 28, June 1955, p. 86 + 5 pages.

Design features, ripple effect, applications, economy. (K1)

248-K. New Welding Process Deposits Metal Faster. *Iron Age,* v. 175, June 16, 1955, p. 90-91.

Development of an automatic submerged-arc welding process which deposits metal up to five times as fast as comparable welding methods and at half the power cost. Photographs. (K1)

249-K. New Resistance Welder Fabricates Wide Wire Mesh at High Speed. *Iron Age,* v. 175, June 2, 1955, p. 100-101.

Resistance welding machine produces wire mesh in widths up to 13 ft. from continuous coils of 4 to 14-gage wire. Photographs. (K3)

250-K. Weldability of Stainless Steel. Helmut Thielsch. *Machine Design,* v. 27, June 1955, p. 157-164.

Design guide to alloy selection, electrode and rod specification and heat treatment procedures. Photographs, tables, micrograph. (K9, SS)

251-K. Convair Procedure in Quality Welding. Fred Monahan. *Machinery,* v. 61, June 1955, p. 200-203.

Welding procedure that covers the engineering of steel weldments, planning of welding operations, design of tooling, material procurement and inspection, heat treatment and other phases of the process. Photographs. (K1, AY)

252-K. 30° Pipe Bevel Best for Pipelines. L. J. Cunningham and S. V. Williams. *Oil and Gas Journal,* v. 54, May 30, 1955, p. 70-73.

Compared with recently revised A.P.I. Standards, which call for a 37½° bevel, the smaller bevel provides a better weld, requires less welding time, and results in greater savings. Micrographs, photographs, diagrams. (K1)

253-K. Flash Butt-Welding for Rails. *Railway Track and Structures,* v. 51, June 1955, p. 34-38.

Process developed in Europe now adapted for use in this country is currently producing continuous rails on the Santa Fe. Photographs, diagram. (K3, ST)

254-K. Tape Control of High Production Riveting. Thomas H. Speller. *Tooling and Production,* v. 21, June 1955, p. 83-86.

Includes diagrams, photographs. (K13)

255-K. How to Use Semi-Automatic Submerged Arc Welding. R. A. Wilson. *Welding Journal,* v. 34, June 1955, p. 535-541.

Advantages of process when used where semi-automatic welding is applicable. Speeds four times greater than conventional hand welding are possible. Photographs, graphs, diagrams. (K1)

256-K. Design and Application of Edge-Ring Projection Welding. Chester A. Czohara. *Welding Journal,* v. 34, June 1955, p. 551-558.

International Harvester applies resistance welding process in the manufacture of spring brackets. Photographs, diagrams, micrograph, tables. (K3)

257-K. Inert Gas Welding of Stator Packs. F. J. Pilia. *Welding Journal,* v. 34, June 1955, p. 559-567.

Requirements for welding, factors influencing and controlling costs, machine design suggestions for stator pack welding. Photographs, diagrams, nomograms. (K1)

258-K. Oxy-Acetylene Flame Keeps Heavy Equipment in Top Shape. J. Dean Davidson. *Welding Journal,* v. 34, June 1955, p. 574, 576, 578.

Oxy-acetylene heating, welding and cutting have a great part in lowering the repair and operating costs of heavy equipment. Photographs. (K2, G22)

259-K. Some Welding Research Problems. *Welding Journal,* v. 34, June 1955, p. 265S-269S.

Compilation to provide university research workers with a list of current welding research problems and to provide project committees with suggestions as to the needs of industry. 4 ref. (K general, A9)

260-K. A Mathematical Analysis of the Temperature Distribution During

Flash Welding. E. F. Nippes, W. F. Savage, H. Suzuki and W. H. Chang. *Welding Journal,* v. 34, June 1955, p. 271S-285S.

Proposed methods for choosing an adequate mean value of thermal diffusivity for a given material and for evaluating the amount of critical burn-off necessary to establish the stabilized temperature distribution. Graphs, diagrams, tables. 6 ref. (K3)

261-K. **Effects of Alloying Elements on Welds in Titanium. II.** G. E. Faulkner. *Welding Journal,* v. 34, June 1955, p. 295S-312S.

Experimental alloys which contained individual and combined additions of most of the commercially important titanium alloying elements were welded and tested to show how alloying elements affect the properties of welded joints in the experimental alloys. Alloying elements studied in the investigation were aluminum, chromium, iron, manganese, molybdenum and vanadium. Photographs. (K general)

262-K. (German.) **Practical Measures Against Shrinking Effects on Welded Constructions From the Standpoint of Economy.** Richard Malisius. *Schweissen und Schneiden,* v. 7, no. 4, Apr. 1955, p. 119-133.

Proposals to the welding engineer for the control of shrinkage stresses and deformations. Photographs, diagrams, graphs, table. 6 ref. (K9, Q25, ST)

263-K. (German.) **Design and Operation of a Portal-Type Projection Welding Machine.** R. Schmarz. *Schweissen und Schneiden,* v. 7, no. 4, Apr. 1955, p. 136-140.

Scope of problems and design data, welding machine, ignitron control, preparation of workpieces. Diagrams, photographs, table. (K3)

264-K. (German.) **Investigations on the Melting Rate of Manual Arc Welding Electrodes.** H. Frankenbusch. *Schweissen und Schneiden,* v. 7, no. 4, Apr. 1955, p. 140-143.

Melting rate expressed in k.g. per hr. as the most suitable index for electrode performance; investigation of factors which affect electrode-melting rate. Photograph, graphs, table. 14 ref. (K1)

265-K. (German.) **Development and Present Situation in Gas-Welding of Rails.** F. Fries. *Schweissen und Schneiden,* v. 7, no. 4, Apr. 1955, p. 144-151.

Compositions of rail steels, effect of melting method on weldability, strength properties of weld joints, importance of and factors to be considered in deposition welding for repair. Tables, photographs, diagrams. 18 ref. (K2, K9, Q23, ST)

266-K. (German.) **Considerations on Failures of Welded American Ships.** H. Dohrmann. *Schweissen und Schneiden,* v. 7, no. 4, Apr. 1955, p. 151-158.

Variable effect of riveting and welding on susceptibility to failures. Difference in internal stresses between riveting and welding as constructional element. Diagrams, photographs. 4 ref. (K general, Q26)

267-K. (German.) **Development and Present Status of Autogenous Rail Welding.** F. Fries. *Schweissen und Schneiden,* v. 7, no. 5, May 1955, p. 190-198.

Methods of joining straight rails, rail crossings and switches. Diagrams, photographs. 4 ref. (K general)

268-K. (German.) **Advances in the Field of Welding and Cutting.** K. K. Zeyen. *Schweissen und Schneiden,* v. 7, no. 5, May 1955, p. 200-207.

Review of literature on effect of hydrogen on weld cracking and quality of weld seams. Tables, photographs. 20 ref. (To be continued.) (K general, Q26)

269-K. (German.) **Modern Welding Electrodes.** W. Hummitzsch. *Schweisstechnik,* v. 9, no. 3, Mar. 1955, p. 26-28.

Comparison of properties and economic efficiencies of principal types. Tables, graphs. (K1)

270-K. (German.) **Welding Electrodes for Joining Unalloyed and Low-Alloyed Steels.** Alfred Schmidt. *Schweisstechnik,* v. 9, no. 3, Mar. 1955, p. 28-31.

Classification, description and specifications according to new German standards; composition and properties of Austrian electrodes. Tables. (K1, CN, AY)

271-K. (German.) **Problems of Soldering Techniques.** J. Colbus. *Schweisstechnik,* v. 9, no. 3, Mar. 1955, p. 31-35.

Effect of temperature, time and flux on the diffusion of silver into sheet copper. Diagrams, micrographs, table. (K7, N1, Ag, Cu)

272-K. (German.) **Hard Soldering Metals That Are Difficult to Solder.** A. Schwarz. *VDI Zeitschrift,* v. 97, no. 13, May 1, 1955, p. 379-380.

Suggestions on the soldering of aluminum bronze, beryllium copper, stainless nickel-chromium and chromium steels, chromium carbides, molybdenum, titanium, zirconium, tantalum and aluminum-to-copper joints. (K7)

273-K. Ferrous Welding Metallurgy With Special Reference to the Welding of Cold-Bent Steel. H. O'Neill. *British Welding Journal,* v. 2, June 1955, p. 241-246.

Welding of steels and cast iron with reference to grain size effects; principles underlying the selection of elements for high-tensile weldable steels; details of strain aging and cracking effects in the welding of cold bent steels. Micrographs, photographs, table. 20 ref. (K1, K2, K3, ST, CI)

274-K. Resistance Welding of High Temperature Alloys. P. M. Howard and D. Wilcox. *Canadian Metals,* v. 18, June 1955, p. 58-62.

Principles, effect of material properties, welding of high-temperature alloys, welding of dissimilar metals, cleaning, quality control. Table, photographs, diagrams. (K3)

275-K. The Welding of Aluminium and Its Alloys. J. F. Lancaster. *Engineers' Digest,* v. 16, May 1955, p. 227-232.

Research progress, welding in production, jigs and fixtures, weld defects, recent developments. Photographs, graphs, table. 13 ref. (K general, Al)

276-K. Joining Aluminium by Soft Soldering. H. C. Watkins. *Engineers' Digest,* v. 16, May 1955, p. 233-236.

Soldering techniques, solder composition, base alloy composition, application of aluminum soldering. Photographs. 12 ref. (K7, Al)

277-K. Production Brazing of Aluminum-Sheathed Heating Elements. Charles A. McFadden. *Industrial Heating,* v. 22, June 1955, p. 1138 + 6 pages.

Semi-automatic brazing machine has timer for automatically throttling the burners after brazing alloy has flowed into joint. Photographs. (K8, Al)

278-K. Automatic Brazing in Molten Salt? *Industry & Welding,* v. 28, July 1955, p. 46-48, 50.

Parts assembled with brazing alloy in place are immersed in molten salt. As soon as immersed joint has reached bath temperature—a matter of seconds—it is removed, quickly quenched or slowly cooled in air as required. Photographs, diagram. (K8)

279-K. How to Use Pulsation Spot Welding. *Industry & Welding,* v. 28, July 1955, p. 59-60, 62.

How to determine timing, tip diameters, pressures and secondary currents. Using this method in welding chromium-molybdenum steels doubled the tensile strength of welds. Diagram. (K3, Q23)

280-K. Welding, Brazing, Joining—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2L-16L.

Historical review of developments in methods and equipment. Future possibilities. Photographs. (K general)

281-K. New Techniques for Spot-welding Aluminum. William R. Gain. *Light Metal Age,* v. 13, June 1955, p. 19 + 5 pages.

Optimum values obtained for spot spacing, edge margin, row spacing and single spot shear strength to satisfy the requirements of ultimate tensile strength and joint fracture in aeronautical welding. (K3, Q23, Al)

282-K. The Production of Continuous Rail-Lengths by Flash Butt Welding. *Machinery (London),* v. 86, June 3, 1955, p. 1188-1191.

Advantages of this method include reduced track maintenance, reduced tire wear on rolling stock, quieter and smoother running, and reduced arcing and consequent burning of moving contacts in electrified systems. Photographs. (K3)

283-K. Welding Titanium Without Filler Rod. Alan V. Levy and Robert Wickham. *Materials & Methods,* v. 41, June 1955, p. 116-118.

Recent experience with "no-rod-added" welds reveal improved joint ductility and results in less grinding. Technique may be extended to titanium alloys. Photographs. (K1, Q23, Ti)

284-K. Added Life for Brazing Fixtures. Charles Emery and Paul Goetcheus. *Steel,* v. 136, June 27, 1955, p. 82-83.

Lasting quality comes from the right alloys and good design. Photographs. (K8)

285-K. Arc Welding for Small-Lot Production. II. Equipment and Processes. Arthur H. Allen. *Tool Engineer,* v. 35, July 1955, p. 83-87.

Selection of manual or automatic processes. Photographs, tables. (K1)

286-K. Method for Determining Correct Amount of Silver Alloy Brazing Wire. Reference Sheet. *Tool Engineer,* v. 35, July 1955, p. 119-120, 123.

Wire selection for maximum joint strength and optimum use of materials. Diagrams, nomograph. (K8)

287-K. Ultransonic Welding of Aluminum. J. Byron Jones, Carmine F.

De Prisco, and John G. Thomas. *U. S. Atomic Energy Commission,* DP-107, Feb. 1955, 48 p.

Preliminary investigation to provide significant information relative to the merits of the process in fabricating ribbed aluminum components for heat exchange purposes, which would provide strength approximating parent metal, and withstand corrosion and thermal cycling. Graphs, tables, diagrams, photographs. (K6, Al)

288-K. Aluminium in Norwegian Shipbuilding. *Welding and Metal Fabrication,* v. 23, June 1955, p. 211-216.

Problems and procedures in metal-arc welding. Photographs, tables. (K1, T22, Al)

289-K. Sigma Welding in Ship Construction. D. B. Tait. *Welding and Metal Fabrication,* v. 23, June 1955, p. 221-223.

Automatic assembly of light-alloy structures. Welding equipment and procedures. (K1, T22, Al)

290-K. Submerged Automatic Arc Welding of Nickel-Chromium Alloys. F. S. Bugrii. *Henry Brutcher Translation No.* 3495, 4 p. (From *Vestnik Mashinostroeniya,* v. 34, no. 8, 1954, p. 85-86.) Henry Brutcher, Altadena, Calif.

Specific effects of carbon and sulfur in alloys upon results of welding experiments; corrosion resistance of specimens; quality of welds obtained. Tables, photographs. (K1, Ni)

291-K. (English.) **The Effects of Contact Resistance Upon Spot Welding.** Isamu Ukita and Tatsuya Hashimoto. *Kyoto University, Engineering Research Institute Technical Reports,* v. 5, no. 3, Mar. 1955, p. 53-73.

Theoretical and experimental examination of the effects of contact resistance on the properties of a weld such as shear strength, temperature distribution and growth of the weld. Photographs, graphs, diagrams, tables. 4 ref. (K3)

292-K. (German.) **The Development of Sigma-Welding and Its Application to Carbon Steels.** H. E. Rockefeller and Peter R. R. Scarr. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 11-15.

Technical development of inert-gas welding with tungsten electrode and with consumable electrode; stability and control of arc in sigma welding; problems and present procedures of welding carbon steels. Photographs, graphs, tables. (K1, CN)

293-K. (German.) **Modern Evaluation of Welding in the Design of Boilers and Tanks.** W. P. Kerkhof. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 66-69.

Stresses in pressure vessels at normal and elevated temperatures; effect of annealing, stresses at base of notch or crack, and plate thickness on strength of weld joints; importance of preheating and subsequent heat treatment. Graphs. (K general, Q25, J general)

294-K. (German.) **Correct and Incorrect Application of the Most Important Processes of Oxy-Acetylene Techniques.** K. W. Sippell, K. Boeckhaus, H. Kunz, W. Lenk and R. Pfeiffer. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 70-79.

Proper and improper methods of gas welding, flame cutting, low-temperature stress-relieving, flame straightening and flame cleaning. Photographs, table, diagrams, graph. (K2, G22, J1, F29)

295-K. (German.) **Correct and Incorrect Application of Electric-Arc Welding.** M. Komers, Denis S. Förster, E. Kauhausen, H. Neumann, H. Schmidt-Bach, E. Sudasch, R. Thoma and Mennen. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 79-88.

Proper choice of electrodes, amperage and source of current; correct handling of different types of electrodes; preparation of weld joints; good welding practice; auxiliary equipment; principles of automatic protective-gas and repair welding. Graphs, photographs, diagrams. (K1)

296-K. (German.) **Resistance Welding of Thin Profiles of Large Cross Section.** K. Seyderhelm. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 101-105.

Effect of current distribution, total current, heat losses of variable wall thicknesses on quality of the weld, effect of the welding process on structure. Diagrams, graphs, photograph, micrographs. 27 ref. (K3)

297-K. (German.) **Possibilities and Limitations of Gluing Metals.** Ernst Rubo. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 106-116.

Techniques of joining metals to metals and metals to nonmetals with hardenable synthetic resins; advantages of process; mechanical testing and strength properties of glued joints. Diagrams, photographs, tables, graph. 19 ref. (K12)

298-K. (German.) **The Present Status of the Thermit Welding Process.** Wilhelm Ahlert. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 116-124.

Metallurgical principles, proper

and improper procedure, effect of heat treatment on properties of thermit welds, practical examples. Photographs, graphs, micrographs, table. (K4)

299-K. (German.) **The Welding Behavior of Corrosion Resistant Chromium-Nickel Steels.** F. Rapatz. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 128-133.

Methods of testing chromium-nickel steels for susceptibility to intercrystalline corrosion and hot shortness; method of detecting and avoiding stress-crack corrosion; effects of carbon content and heat treatment. Photographs, micrographs, tables, graphs.
(K general, R1, J general, SS)

300-K. (German.) **Sigma Welding and Its Application, Especially in the Processing of Steels.** Lothar Wolff. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 134-140.

Principle and basic requirements for sigma welding, control of wire feed, difficulties of welding soft and unsilicized carbon steels, type and voltage of electric current, composition of welding rod, surface condition of the material, properties of sigma welds and economy of the process. Photographs, tables, graphs, diagrams. 3 ref. (K1, CN)

301-K. (German.) **Problems of Soldering and Brazing. II.** J. Colbus. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 140-147.

Definition of terms, temperature measurements, strength properties of soldered joints, effects of fluxes with and without wetting agents. Diagrams, photographs, graphs, tables. 11 ref. (K7, K8)

302-K. (German.) **The Present Status of Rail Welding.** M. de Miro-Ramonacho. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 148-158.

Advantages and objections to continuous rails, critical evaluation of different methods of welding and laying rails, modern practice of rail welding in different countries. Graphs. 169 ref. (K general)

303-K. (German.) **Stud Welding.** K. L. Zeyen. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 159-167.

Principle of stud welding, special characteristics of "Cyc-Arc" and "Nelson" processes and their advantages. Photographs, table, diagrams. 10 ref. (K1)

304-K. (German.) **The Electric Weld Arc and Its Importance to Electrical High-Temperature Processes.** Johannes Wotschke. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 168-173.

Actions of the electric arc and its energies in welding, smelting and melting. Diagrams, graphs. 7 ref. (K1, C21, D5)

305-K. (German.) **Welding Electrodes for Welding Unalloyed and Low-Alloyed Steels.** Alfred Schmidt. *Schweisstechnik,* v. 9, no. 4, Apr. 1955, p. 37-39.

Preparation of weld test bars and composition of welding electrodes. Diagrams, tables. (K1, ST)

306-K. (German.) **Problems of Soldering Techniques.** J. Colbus. *Schweisstechnik,* v. 9, no. 4, Apr. 1955, p. 42-45.

Effect of width of soldered joint, fracture resistance of base material and solder, metallurgical changes from soldering and solder-base material bond on the mechanical properties of soldered joint. Graphs, table. 30 ref. (K7, Q general)

307-K. (German.) **Optical Stress Measurements on Glass-Metal Bonds at Higher Temperature.** Horst Herrmann. *Zeitschrift für angewandte Physik,* v. 7, no. 4, Apr. 1955, p. 174-176.

Special furnace microscope arrangement to study stresses in glass-metal bonds under polarized light. Diagram, photograph, graphs. 3 ref. (K11, Q23)

308-K. (German.) **Studies on the Bonding of Metals.** Hermann Winter. *Zeitschrift für Flugwissenschaften,* v. 3, nos. 3-4, Mar.-Apr. 1955, p. 87-94.

Experiments on the bonding of metals with "Redux" and "Araldit". The results of static and dynamic tests are given. Diagrams, graphs. (K12)

309-K. (Russian.) **Carbon and Silicon Alloying of the Low-Carbon Steel in Electrodes for Welding of Cast Iron.** A. N. Shashkov. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 1-5.

Calculations of thickness and composition of alloying layer of coating, rates of solution, retarding and other factors in relation to flux-shielded metal-arc welding. Graphs, diagrams, phase diagram. 8 ref. (K1, ST, CI)

310-K. (Russian.) **Effect of Flowability of Welding Bath on the Geometrical Form of the Welded Seam and on the Technological Applicability of the Welding Process.** A. A. Erokhin. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 5-9.

Relation of flowability to current, arc voltage and rate of welding for different electrodes. Effect of fluxes. Graphs, tables, diagrams, micrograph. 5 ref. (K1)

311-K. (Russian.) **Electrodes for Welding and Cutting Metal Under Water.** T. I. Avilov. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 9-10.

Proportion of gases (H_2, CO, CO_2) in which arc burns, gas pressure and other factors. Strength and microstructure of welds with respect to compositions of electrodes used. Oxygen cutting. Graphs, tables, micrograph. (K1, G22, M27)

312-K. (Russian.) **Flux-Shielded Metal-Arc Welding of Open-Hearth Furnace Framework Strutting.** D. P. Lebed' and I. S. Miroshnichenko. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 11-13.

Parameters for welding procedure, including current strength, feed of electrode wire, depth of flux bath, etc. Chemical composition and mechanical properties of base metal, electrodes and welds. Tables, diagram, micrographs. 4 ref. (K1, Q general, ST)

313-K. (Russian.) **Gas Welding of Brass-L62.** G. A. Asinovskaia. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 15-18.

Microstructural changes in weld and base metal, mechanical properties of weld. Diagram, photographs, micrographs, tables, graphs. 4 ref. (K2, M27, Q general, Cu)

314-K. (Russian.) **Arc Welding of Brass.** M. M. Bort. *Svarochnoe Proizvodstvo,* 1955, no. 6, June, p. 18-21.

Mechanical properties and microstructure of specimens arc welded with and without heat treatment; chemical composition of base metal and welded-on metal; welding procedure; comparison with gas welding results. Tables, micrographs, photographs. (K1, Q general, M27, Cu)

315-K. **Report of Committee D-11 on Rubber and Rubber-Like Materials.** *American Society for Testing Materials, Preprint No.* 44, 1955, 18 p.

Tentative specifications for ozone resistant rubber insulating tape; proposed revision of tentative test methods for adhesion of vulcanized rubber to metal and of testing hard rubber products. Table, diagrams, photographs. (K12)

316-K. **Some Interesting Welding Investigations.** I. W. P. Campbell and M. J. Nolan. *Canadian Metals,* v. 18, July 1955, p. 42-45.

Show result of failure to observe some detail of welding procedure or technique, or possibly, a misapplication of welding. Photographs, micrographs. (To be continued.) (K9)

317-K. **Review of High Temperature Metal-Ceramic Seals.** Hayne Palmour, III. *Electrochemical Society, Journal,* v. 102, July 1955, p. 160C-164C.

Technical review of the development of metal-ceramic seals with emphasis on methods devised for high temperature brazing of metals to low-loss technical ceramics for electronic applications. Photographs, diagrams, tables, graphs. 13 ref. (K11)

318-K. **Pressure Welding Gives Stronger Titanium Joints.** A. P. Lage and S. S. Smith. *Iron Age,* v. 176, July 14, 1955, p. 103-105.

Provides a reliable method of fabricating 3% Al, 5% Cr titanium alloy and produces a forged butt weld of superior strength by upsetting the faying surfaces under heat and pressure. Photographs, micrographs, table. (K2, Ti)

319-K. **Weldability of Cast Steels.** Helmut Thielsch. *Machine Design,* v. 27, July 1955, p. 167-171.

Design recommendations for welding procedures, electrode specifications and heat-treatment methods for cast carbon and low alloy steels. Table, photographs. (K9, CI)

320-K. **Effect of Silicon in Submerged Arc Welds.** W. Simon. *Materials & Methods,* v. 42, July 1955, p. 132-134.

Investigation to determine the effect of silicon content on brittleness of weld joints. Graphs, tables. 3 ref. (K1)

321-K. **Adhesive Bonded Metal Joints.** R. T. Schwartz and R. E. Wittman. *Product Engineering,* v. 26, July 1955, p. 170-173

Measurements of room-temperature shear strength on lap joints show that rates of loading from static to impact speeds have no effect on strength. Eight different adhesives evaluated, ranging from rigid resin-type to less rigid rubber-resin plastic compounds. Tables, diagram, graphs. (K12)

322-K. **Some Current Aspects of Industrial Brazing.** John E. Hyler. *Steel Processing,* v. 41, July 1955, p. 426-431, 458.

Fluxes and brazing alloys, flow temperatures, electrical resistance, brazing, flame-fluxing method, and aspects of furnace brazing. Photographs. (K8, Ag)

323-K. (German.) **Arc Welding of Aluminum Under the Protection of**

Inert Gases. W. Mantel and L. Wolff. *Aluminium,* v. 31, no. 6, June 1955, p. 255-259.

"Argonarc" and "sigma" welding. Description, optimum conditions, economy of the method. Graphs, micrographs. 4 ref. (K1, Al)

324-K. (German.) **A New Method of Flash-Butt Welding of Aluminum Alloys.** A. Klopfert. *Aluminium,* v. 31, no. 6, June 1955, p. 260-266.

The method, with special reference to its effects on the design and properties of the manufactured components. Diagrams, photographs, tables. 1 ref. (K3, Al)

325-K. (German.) **Application of Modern Welding Techniques in Construction of Hoisting Equipment Made of Aluminum Alloy.** J. Weisgerber and Puschner. *Aluminium,* v. 31, no. 6, June 1955, p. 266-270.

Structural design of the welded joint; method of arc welding; composition of the alloy. Photographs, diagrams, micrographs. 1 ref. (K1, Al)

326-K. (German.) **Hatch Beams of Aluminum-Alloys. (AlMgSi).** A. Szymanski. *Aluminium,* v. 31, no. 6, June 1955, p. 271-274.

Machine arc welding of aluminum-magnesium-silicon alloy. Welding joints, method and machine used. Diagrams, photographs, graphs, table. 3 ref. (K1, Al)

327-K. (German.) **Investigation of Adhesive Bonding of Metals.** G. Kaliske. *Aluminium,* v. 31, no. 6, June 1955, p. 275-281.

Survey of present status. Influence of a series of factors, such as thickness of joined parts, method of joining and material, on the strength of the bonded joint. Adhesive materials. Graphs, photographs. 20 ref. (K12)

328-K. (German.) **The Application of Welding in Modern Steel Building, Bridge Construction, and Rail Joining.** Otto Steinhardt. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 236-241.

Influence of welding on constructional development, typical elements of design for welding, examples of modern realizations of weld-fit designs; continuous rail welding. Photographs, graphs, diagrams. (K general, T26, ST)

329-K. (German.) **The Application of Welding in Shipbuilding.** J. Hansen. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 241-246.

Development of welding in ships, assembly of prefabricated parts, characteristic details of welded design, influence of vibrations on welded ships, failures and their consequences. Photograph, diagrams. (K general)

330-K. (German.) **The Application of Welding in Modern Motor Car Fabrication.** Otto Gengenbach. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 251-256.

Welding processes, especially spot welding, constructional development of motor cars, manufacture of car bodies and electrical sets of welding machines. Photographs, diagrams. (K general)

331-K. (German.) **The Application of Welding in the Construction of Containers and Pipings and in Pipe Manufacture.** W. Rädeker. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 257-261.

Materials, bending procedure, welding methods and finishing. Photographs, graph, diagram. (K general)

332-K. (German.) **The Application of Welding in Modern Boiler and Pressure Vessel Design and Manufacture.** R. Quack. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 262-264.

Welding of boiler drums, pipes, collectors and pressure vessels. Photographs, diagrams. (K general)

333-K. (German.) **The Application of Welding in Machine Construction With Special Reference to Rigidity, Tension, and Straining of Material.** F. W. Griese. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 265-270.

Relations between working conditions, design and material from the designer's point of view. Diagrams. (K general)

334-K. (German.) **Welding as a Problem of Materials—On the Brittle Fracture of Steel.** A. Matting. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 270-274.

Conditions for brittle fracture, present testing methods, proposal for a new testing method. Photographs, diagrams. 13 ref. (K general, Q26, ST)

335-K. (German.) **Advantages of Welding for Design and Production.** C. Stieler. *Schweissen und Schneiden,* v. 7, no. 6, June 1955, p. 274-279.

Review of the improvements by welding, welding and casting and welding and riveting. Photographs, graph, diagrams. (K general)

336-K. (Spanish.). **Automatic Arc Welding.** Evert H. Bylin. *Ciencia y técnica de la Soldadura,* v. 5, no. 23, Mar.-Apr. 1955, 6 p.

Study of the problem of continuity of coated electrodes in automatic arc welding. Diagrams, photographs. (K1)

337-K. (Spanish.) **Problem of Weldability in Resistance Welding.** C. Penche Felgueroso. *Ciencia y técnica de la Soldadura,* v. 5, no. 23, Mar.-Apr. 1955, 10 p.

Study of transformations taking place in difficult weldable materials during electric resistance welding according to different processes. Graphs, diagrams, micrographs. 7 ref. (K3, K9, N general)

338-K. (Spanish.) **Spot Welding of High-Strength Steels. Method for Determining the Regulation of Resistance Welding Machines. Presentation of a Regulation Diagram.** P. Joumat. *Ciencia y técnica de la Soldadura,* v. 5, no. 23, Mar.-Apr. 1955, 4 p.

Principle of spot welding method; use of regulation diagram. (K3, AY)

339-K. The Composition of Weld Metal. W. P. van den Blink. *British Welding Journal,* v. 2, July 1955, p. 285-290; disc., p. 291-292.

Influence of metallurgical factors, especially in mild steel electrodes; effect of composition on properties and operative characteristics. Tables, graphs, photograph. 30 ref. (K1, CN)

340-K. The Economic Proportion of Welding in Shipbuilding. W. R. Mellanby. *British Welding Journal,* v. 2, July 1955, p. 299-304.

Concludes that the most economic design for a cargo vessel is one with an all-welded double bottom, as well as both decks, and with welded shell butts and seams; however, if large sections cannot be prepared at ground level, riveting of the shell is preferred. Tables, graphs, diagrams. (K general)

341-K. A Method for Calculating the Effect of Preheat on Weldability. C. L. M. Cottrell and B. J. Bradstreet. *British Welding Journal,* v. 2, July 1955, p. 305-309.

An equation, derived by experiment, relates the cooling rate at 300° C. in the weld heat affected zone to the geometry of the joint, the size of the weld and the initial plate temperature and applies to metal-arc welds made on mild and low-alloy steels. Tables, graphs. 6 ref. (K9, CN)

342-K. Calculated Preheat Temperatures to Prevent Hard-Zone Cracking in Low-Alloy Steels. C. L. M. Cottrell and B. J. Bradstreet. *British Welding Journal,* v. 2, July 1955, p. 310-312.

Tables present preheat temperature required for the metal-arc welding of a low-alloy steel from the dimensions and form of the joint, the weld size and the weldability of the steel. Tables. 3 ref. (K1, K9, CN)

343-K. The Industrial Use of High-Energy Materials. C. H. Carlton, F. A. Warren and J. H. Wiegand. *Chemical Engineering Progress,* v. 51, July 1955, p. 335-338.

Applications of explosives in riveting, stud driving, metal forming, oil well perforating and other operations. Diagrams, graphs. 14 ref. (K13, G general)

344-K. Aluminium-Alloy Concave-Pointed Rivets. Small Loads Suffice for Closing. J. D. Haddon. *Engineering,* v. 180, July 15, 1955, p. 79-83.

Concave rivets, closed with a comparatively small squeeze load, may be successfully used in joints in which the rivet is chiefly subjected to shear if a small point length is provided to prevent the rivet from pulling out of its hole before it fails by shear. Diagrams, graphs, photographs, tables. 4 ref. (K13, Al)

345-K. Arc Welding for Small-Lot Production. III. Tooling the Job. Arthur H. Allen. *Tool Engineer,* v. 35, Aug. 1955, p. 89-93.

Design and use of jigs and fixtures, costs. Photographs, tables. (K1)

346-K. Fabrication of Water Turbine Components. F. Buckley. *Welding and Metal Fabrication,* v. 23, July 1955, p. 236-243.

Advantages and disadvantages of welding cast, rolled or forged forms into water turbine components. Photographs. (K general)

347-K. The Economic Application of Automatic Arc Welding Equipment. J. A. Lucey. *Welding and Metal Fabrication,* v. 23, July 1955, p. 251-257.

Methods which must be employed to secure maximum economies with automatic welding. Graphs, photographs. (K1)

348-K. Automatic Control of Machine Arc Welding. F. Hirschmann. *Welding and Metal Fabrication,* v. 23, July 1955, p. 262-264.

Equipment for arc length control, which is nonelectronic, makes the welding torch follow the profile of the workpiece and also moves the torch towards the workpiece and away from it, at the start and end

of the weld. Diagrams, photographs, graphs, tables. (K1)

349-K. Nomograph for Weight of Electrode Metal Required. Tyler G. Hicks. *Welding Engineer,* v. 40, Mid-June 1955, p. 27.

Chart for making quick estimates of the weight of electrode metal required for a given joint. Nomograph. (K1)

350-K. How to Figure Diameter or Length of Brazing Wire. *Welding Engineer,* v. 40, Mid-June 1955, p. 42A.

Guide for selecting proper alloy wire size for brazing tubular or linear joints of given specifications. Nomograph, diagrams. (K8)

351-K. Material Characteristics as Related to Resistance-Welding Current and Pressure. *Welding Engineer,* v. 40, Mid-June 1955, p. 47.

Nomograph relating relative hardness and electrical conductivity of various alloys to current and pressure. Nomograph. (K3)

352-K. Inert-Gas Welding in the Aircraft Industry. J. M. Thompson, Jr. *Welding Journal,* v. 34, July 1955, p. 635-640.

Several applications of inert-gas welding of aluminum, magnesium, titanium and stainless steel. Photographs. (K1, Al, Mg, SS, Ti)

353-K. Hand Welding 5-Chrome and 9-Chrome Pipe. W. J. Lester. *Welding Journal,* v. 34, July 1955, p. 641-647.

An alternative procedure which allows cooling from the preheat temperature to ambient conditions after a ½-hr. post-heat at 500° F., followed by stress relieving at a more convenient time. Photographs, diagrams, graphs, tables, micrographs. (K1, J1, Cr)

354-K. Inert-Gas-Shielded Tungsten-Arc Spot Welding. C. A. McClean. *Welding Journal,* v. 34, July 1955, p. 648-656.

Investigation of variables, recommended procedures, comparison with resistance spot welding and job applications. Photographs, diagrams, graphs. 5 ref. (K3, ST, SS)

355-K. Titanium Alloy Weldability and Correlated Metallurgy. H. L. Meredith and C. W. Handova. *Welding Journal,* v. 34, July 1955, p. 657-672.

Extensive tests indicate alpha and alpha-beta titanium alloys are readily weldable by the inert-gas tungsten-arc process. Photographs, graphs, micrographs, diagrams, tables. (K9, K1, Ti)

356-K. Joining of Beryllium. D. C. Martin. Paper from "The Metal Beryllium". American Society for Metals, p. 283-294.

Three methods, fusion, self welding and brazing, discussed as means of joining beryllium to itself and to other metals. The use of shielded arc, straight polarity, direct current and beryllium filler have yielded best results. Photographs, micrographs, diagrams, tables. 9 ref. (K1, K4, K8, Be)

357-K. (French.) **Development of the Use of Gas Flux in the Joining of Metals.** B. Liebesman. *Soudage et Techniques connexes,* v. 9, nos. 5-6, May-June 1955, p. 119-125; disc., p. 125-126.

Apparatus using gas flux incorporated in the flame for welding, brazing and solder-brazing, makes it possible to eliminate cleansing powders and coated rods. Photographs, diagrams, table. (K2, K7, K8)

358-K. (French.) **A Process for Killing the Melting Bath in the Welding of Steels.** A. Leroy, H. Granjon and M. Evrard. *Soudage et Techniques connexes,* v. 9, nos. 5-6, May-June 1955, p. 127-129; disc., p. 129-130.

Conditions for preventing reaction between carbon and iron oxide during welding of steel by use of killing additions and aluminum metallization of the edges to be welded. Micrographs. (K1, ST)

359-K. (French.) **Some Particular Applications of the Oxy-Acetylene Flame.** M. Evrard. *Soudage et Techniques connexes,* v. 9, nos. 5-6, May-June 1955, p. 141-146; disc. p. 146.

Structural modifications of oxy-acetylene welds in heavy gage aluminum; changes in stress states and surface states. Photographs, radiographs, diagram. 4 ref. (K2, Al)

360-K. (Russian.) **Automatic Submerged-Arc Welding of Steel Sheets in Lower Position.** F. F. Benua and A. I. Katler. *Svarochnoe Proizvodstvo,* 1955, no. 7, July, p. 1-4.

Flux used, welding conditions, including current strength at each electrode, and welding and feed rates. One-direction, one-pass operation worked out. Tables, photographs, diagram. 18 ref. (K1, ST)

361-K. (Russian.) **Effectively Weldable Cast Steel of High Strength.** I. P. Krianin. *Svarochnoe Proizvodstvo,* 1955, no. 7, July, p. 7-9.

Types of defects and the microstructure of welded joints and seams; effect of types of heat treatment for base metals and seams,

and of alloying elements on strength and hardness. Micrographs, table, graphs, photographs. 8 ref. (K9, M27, J general, Q23, Q29, CI)

362-K. (Russian.) **Ceramic Fluxes for Automatic Arc Welding.** K. K. Khrenov and D. M. Kushnerev. *Svarochnoe Proizvodstvo,* 1955, no. 7, July, p. 13-16.
Effect of fluxes on strength, hardness and microstructure of base metal and surface. Micrographs, photographs, tables. 7 ref. (K1, M27, Q23, Q29, ST)

363-K. Submerged Arc Welding Fabricates a Light Weight Diesel Crankcase. Albert C. Drechsler. *Industry & Welding,* v. 28, Aug. 1955, p. 62-66.
Development of automatic welding fixture used in the fabrication of steel forgings and flame cut steel. Photographs, diagrams. (K1, ST)

364-K. Here's How to Use Projection Welding. *Industry & Welding,* v. 28, Aug. 1955, p. 76-78, 80.
Projection sizes and shapes, current and pressures, weldable metals, precautionary measures. Table, diagrams. (K3)

365-K. Use CO_2 Shielding Gas in Automatic Welding Mild Steels. R. W. Tuthill. *Industry & Welding,* v. 28, Aug. 1955, p. 46-48, 80-82.
Control and gas requirements, speed of wire feed, appearance of weld surface, electrode specifications. Photographs, diagram. (K1, ST)

366-K. Notes on the Role of Hydrogen in Metal Arc Welding. P. D. Blake. *Welder,* v. 24, Jan.-Mar. 1955, p. 14-20.
Review of literature on the deleterious effects of hydrogen upon weld metal. Photographs, diagram. 11 ref. (K1, K9, AY)

367-K. Automatic Arc Welding of Tractor Components. D. L. Hanson. *Automotive Industries,* v. 113, Aug. 1, 1955, p. 66-67, 126.
Automatic process is cheaper, faster and better than the manual process. Photographs. (K1, ST)

368-K. Comparison of Welded and Riveted Ship Construction. B. Baxter. *Engineering,* v. 180, July 22, 1955, p. 108-110.
Results of investigations to find relationship, if any, between welded ship failures and design, with particular reference to the differences in structural behavior between riveted and welded ships. Graph. (K1, K13, K9)

369-K. Induction Soldering. I. D. Warburton-Brown. *Machinery Lloyd (Overseas Ed.),* v. 27, July 23, 1955, p. 37, 39, 41-42.
Some information on alloys used and theoretical principles underlying formation of joints, detailed description of the high-frequency method of soft soldering. Diagrams, graph, tables. (To be continued.) (K7)

370-K. Stud Welding With Welding Cartridges. W. P. van den Blink, E. H. Ettema, and P. C. van der Willigen. *Philips Technical Review,* v. 17, Aug. 1955, p. 37-45.
Semiconducting welding cartridge on stud end serves as heater, spacer and flux for correct stud placement. Diagrams, photographs. 5 ref. (K1, ST)

371-K. Filler Metals for Joining. Orville T. Barnett. *Welding Engineer,* v. 40, Aug. 1955, p. 30-32.
Describes E6010 d.c. electrode and the more versatile E6011 a.c. or d.c. electrode and their applications. Tables, diagrams, photograph. 2 ref. (K1, T5, ST)

372-K. Copper Contacts Formed Faster. Corwin S. Selby. *Welding Engineer,* v. 40, Aug. 1955, p. 40-41.
Formerly "hogged" from solid ships, contacts are made faster, cheaper and better by brazing and soldering. Photographs. (K7, K8, Cu)

373-K. (French.) **Application of "Downward" Welding to the Joints of Pipelines.** L. Riviere. *Arcos,* v. 32, no. 132, 1955, p. 3420-3426.
Conditions and electrodes used in and advantages of a new French method. Diagrams, photographs. (K1, ST)

374-K. (German.) **Soft Solders for Special Purposes.** A. Keil. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 689-692.
Properties, uses and applications of binary and ternary alloys of cadmium, zinc, lead and tin as solders; influence of copper and silver additions. Diagrams, graphs, tables, micrograph. 9 ref. (K7, Cd, Zn, Pb, Sn, Cu, Ag)

375-K. (German.) **Progress in the Field of Welding and Cutting.** K. L. Zeyen. *Schweissen und Schneiden,* v. 7, no. 7, July 1955, p. 305-313.
Hydrogen in austenitic weld seams, and its influence in nonwelded steel; hydrogen content in welded seams and its determination. Tables. 42 ref. (K2, ST)

376-K. (Russian.) **Soldering With Heat Resistant Solders.** V. A. Gorokhov and M. I. Skripov. *Vestnik*

Mashinostroeniia, v. 35, no. 7, July 1955, p. 47-51.

Composition of the solder, method of operation, strength properties of soldered joints. Graphs, diagrams, micrographs. (K7, Q23)

377-K. Arc-Welding Costs: Proposals for Proving New Methods of Measurement. A. G. Thompson. *British Welding Journal,* v. 2, Aug. 1955, p. 350-357.

Design of tests and procedures to investigate proposed methods of measuring cost-output relationships for arc welding. Tables, graphs, diagrams. 3 ref. (K1)

378-K. Some Interesting Welding Investigations. II. W. P. Campbell and M. J. Nolan. *Canadian Metals,* v. 18, Aug. 1955, p. 47-48, 50.

Effects of errors in technique on performance of welds in steam piping. Photographs, micrographs. (K general)

379-K. New Control System Cuts Scrap Loss on Tube Welding Line. D. C. Fisher. *Iron Age,* v. 176, Aug. 4, 1955, p. 84-86.

New automatic control system for induction welding electrical conduit line measures strip thickness, stores information while tubing is being formed, then sets welding current accordingly. Diagrams, photographs. (K6, S14, ST)

380-K. Design of Joints for Induction Soldering. D. Warburton-Brown. *Machinery Lloyd (Overseas Ed.),* v. 27, July 30, 1955, p. 69-78.

Practical joint and workcoil designs for several products. Graph, diagrams, photograph. (K7)

381-K. Bonding Aluminium-Tin Alloys to Steel. *Tin and Its Uses,* 1955, no. 32, July, p. 8-9, iii of cover.

Bond is accomplished by intermediate iron-aluminum alloy layer. Photograph, micrograph. (K5, Al, Fe, Sn)

382-K. Radiographic Standards for Quality Control of Aluminium Alloy Butt Welds by the Self-Adjusting Arc Process. J. G. Young. *Welding and Metal Fabrication,* v. 23, Aug. 1955, p. 278-285.

Techniques used in preparation of samples and description of radiographic technique and method of interpretation of radiographs. Mechanical test techniques and results discussed and compared with defects apparent from radiographs. Tables, graph, radiographs, micrographs. (K9, K1, S13, Al)

383-K. Resistance Welding of Stabilized Stainless Steel Strip. E. J. Keefe and D. R. Nash. *Welding and Metal Fabrication,* v. 23, Aug. 1955, p. 289-294.

Results of tests indicating that the addition of stabilizing elements produces differences in both the weld strength and in the optimum welding conditions. Tables, graphs, micrographs, macrographs, diagrams. 6 ref. (K3, SS)

384-K. Electrolytic Welding and Brazing. P. Zuffa. *Welding Journal,* v. 34, Aug. 1955, p. 378S.

Physical principles of electrolytic heating and applications. Circuit diagrams. (K1, K8)

385-K. Effects of Interstitial Elements on Weldability of Titanium Alloy Sheet. I. H. M. Meyer. *Welding Journal,* v. 34, Aug. 1955, p. 379S-393S.

Impairment of the weldability of titanium alloy sheet, under some conditions, by three interstitial elements, carbon, nitrogen and oxygen. Tables, graphs, photograph, micrographs. 8 ref. (K9, Ti)

386-K. Maintenance Welding and Cutting Operations on Radioactive Process Equipment. E. B. Lavelle and J. M. Fox, Jr. *Welding Journal,* v. 34, Aug. 1955, p. 731-740.

Account of detailed preparations using protective clothing and devices, timed movements and rehearsed steps to protect personnel and assure satisfactory maintenance welding operations. Photographs. (K1, G22, A7)

387-K. Fabrication of Bridge Plate Girders by Submerged Arc Welding. Joseph H. Hoffman. *Welding Journal,* v. 34, Aug. 1955, p. 741-746.

Method of fabricating a welded plate girder bridge span starting with the cutting to size of the plates, jigs used for fitting and welding, welding procedure using the tandem submerged-arc-welding process, shop changes in welding machine carriage to suit welding conditions, and loading for shipment. Photographs, diagrams. 3 ref. (K1, ST)

388-K. Joint Detail for Inert Arc Welding of Pressure Piping. R. T. Pursell. *Welding Journal,* v. 34, Aug. 1955, p. 747-751.

Technique wherein proper preparation of root edges of joint produces satisfactory uniform inside bead conditions in all positions. Photographs, table, diagrams. (K1, ST)

389-K. Evaluating the Iron-Powder Coated Electrodes for Production Use. Donald B. Howard. *Welding Journal,* v. 34, Aug. 1955, p. 752-758.

Preliminary tests performed on 23 different brands; evaluation in accordance with requirements of ASTM specifications. Photographs, tables, diagram. (K1, S22)

390-K. Some New Concepts on Welding Qualification Requirements. S. A. Greenberg. *Welding Journal,* v. 34, Aug. 1955, p. 759-760.

Requirements for the degree of qualification for a joint welding procedure based on the severity of service conditions for which a product or structure is designed. (K general, S22)

391-K. Structural Steel Welding. A. L. Fenlason. *Welding Journal,* v. 34, Aug. 1955, p. 768-769.

Joint design, welding procedure, operation qualifications and visual inspection of welds. Photographs. (K1, ST)

392-K. Nickel Chrome Brazing of Stainless. R. A. Gustafson. *Western Metals,* v. 13, Aug. 1955, p. 54-56.

Advantages of nickel-chromium brazing alloys, characteristics of joints, brazing furnaces. Micrograph, photographs. (K8, SS)

393-K. The Metallurgical Principles of the Joining of Metals. Hugh O'Neill. Paper from "The Joining of Metals". Institution of Metallurgists, p. 5-25.

History, contaminants, joints with nonmetals, solid phase welding and other aspects. Tables, graphs, diagram, photographs, micrograph. 36 ref. (K general)

394-K. Metallurgy of the Welding of Non-Ferrous Metals. W. K. B. Marshall. Paper from "The Joining of Metals". Institution of Metallurgists, p. 26-59.

Problems of oxide inclusions, effects of gases, termal effects and corrosion to this heterogeneous group considered. Table, graphs, photographs, micrographs. 23 ref. (K general, EG-a)

395-K. Metallurgy of Welding of Carbon and Low Alloy Steels. L. Reeve. Paper from "The Joining of Metals". Institution of Metallurgists, p. 60-94.

Considers the deposited weld metal, the arc welding electrodes and base material, especially in the weld boundary and the heat effected zone. Tables, graphs, diagrams, photographs, micrographs. 21 ref. (K1, ST)

396-K. The Metallurgy of Welding of the Cr-Ni Austenitic Steels. F. H. Keating. Paper from "The Joining of Metals". Institution of Metallurgists, p. 95-126.

Effects of heating during oxy-acetylene welding of these alloys and measures required to maintain metal quality. Tables, graphs, photographs. micrographs. (K2, N8, AY)

397-K. The Metallurgy of Soldering and Brazing. J. C. Chaston. Paper from "The Joining of Metals". Institution of Metallurgists, p. 127-145.

Five critical properties for successful solder or braze. Graphs, diagrams, photograph, phase diagrams. 8 ref. (K7, K8)

398-K. The Determination of Weldability. J. G. Ball. Paper from "The Joining of Metals". Institution of Metallurgists, p. 146-174.

Review limited to determining suitability of materials for joining rather than performance in service. Numerous British, American and German tests illustrated. Graphs, diagrams, photographs, micrographs. 20 ref. (K9)

399-K. Epoxy-Resin Base Adhesives. D. W. Elam. Paper from "Symposium on Adhesives and Sealants in Aircraft Applications". Society of Autotomotive Engineers, 11 p. + 7 plates.

Chemistry of epoxy resins, theory of cure with various curing agents, requirements during processing, physical properties of adhesive bonds over a range of temperature. Examples of aircraft sub-assemblies which were bonded with epoxy-base adhesives. Tables, photographs, diagrams, graphs. 3 ref. (K12)

400-K. Phenolic Based Adhesives. E. P. Carmichael and W. F. Gross. Paper from "Symposium on Adhesives and Sealants in Aircraft Applications". Society of Automotive Engineers, 8 p. + 6 plates.

Types, processing characteristics, properties of joints. Tables, graphs, photographs. (K12)

401-K. Rubber-Like Adhesives and Sealants. W. J. Clayton and R. K. Humke. Paper from "Symposium on Adhesives and Sealants in Aircraft Applications". Society of Automotive Engineers, 15 p. + 1 plate.

Uses in various industries, advantages over other fasteners, special applications, vehicles and solvents, future possibilities. Graphs, diagrams. (K12)

402-K. The Theory and Fundamentals of Adhesion. N. A. de Bruyne. Paper from "Symposium on Adhesives and Sealants in Aircraft Applica-

tions". Society of Automotive Engineers, 11 p. + 6 plates.

Wetting of adherend by adhesive, capillary forces between flat plates, effect of contact angle on stress concentration, stress distribution in lap and butt joints, intermolecular forces. Photographs, graphs, diagrams. 23 ref. (K12)

403-K. (French.) **Some Applications of Welding to the Construction and Maintenance of Modern Equipment of Power Plants.** A. Lüthy. *Zeitschrift für Schweisstechnik,* v. 45, no. 8, Aug. 1955, p. 145-156, 161-163.

Welding of live-steam pipes, cast iron turbine frames, turbine shafts, generators, transformers, turbine wheels. Photographs, diagrams. (K1, CI, ST)

404-K. Chromium Carbide Requires Special Flux for Silver Brazing. C. R. Benson and E. S. Chamer. *American Machinist,* v. 99, Sept. 12, 1955, p. 126-127.

Use of a boron-containing flux gives stronger joints, resistant to higher temperatures. Photographs, table. (K8, Cr, C-n)

405-K. Aluminum Pipe Field Welding Speeded by Inert Gas Shielded Metal Arc Process. R. A. Stone and W. H. Wooding. *Heating, Piping & Air Conditioning,* v. 27, Sept. 1955, p. 113-117.

Advantages include fast welding speeds, good heat concentration, removal of surface oxide and prevention of reoxidation and absorption of gas by the weld metal. Photographs, tables. (K1, Al)

406-K. Ceramic Back-Up Rings for Pipe Welding. Lew Gilbert. *Industry & Welding,* v. 28, Sept. 1955, p. 40-42, 44.

Pipe is welded with a very slight land and no root gap. Back-up ring is removed. Diagram, photographs. (K1, SS)

407-K. How to Braze Fittings to Steel and Copper Tubing. Charles Berka. *Industry & Welding,* v. 28, Sept. 1955, p. 46-48, 96-97.

Jigs, brazing alloys and techniques illustrated. Braze metal clearances are maintained. Photographs. (K8, Cu, CI, ST)

408-K. Your Stainless Welds—Are They Corrosion-Resistant? Leak-Tight? A. Grodner. *Industry & Welding,* v. 28, Sept. 1955, p. 52-54, 98-99.

Fabrication and test details for a 30,750-gal. stainless steel (Type 316 ELC) atomic waste storage tank. Photograph, diagram. (K1, SS)

409-K. Do's and Don'ts for Welding Structural Steel. Charles I. Orr. *Industry & Welding,* v. 28, Sept. 1955, p. 58 + 5 pages.

Seven design points stressed. Usual sins are using rivet designs and overwelding. Photographs. (K1, ST)

410-K. How and Where to Use Seam Welding. *Industry & Welding,* v. 28, Sept. 1955, p. 71-74.

Step-by-step details for welding steel and other metals; gas-tight welds. Tables. (K3, ST, Al)

411-K. Multiple Spot Welding by the "Press Welding" Technique. *Machinery (London),* v. 87, Aug. 5, 1955, p. 284-293.

Application of a high-speed process to auto body fabrication. Diagrams, photographs. (K3, ST)

412-K. Spot Welding of Structural Aluminum. William R. Gain. *Product Engineering,* v. 26, Sept. 1955, p. 193-198.

Use of spot welding on aircraft gives sound joints when weld current, weld and forging pressures and metal cleaning are accurately controlled. Advantages over other joining methods include high production rate, no added weight, relatively smooth flush surface and no holes in sheet to be sealed. Photographs, diagrams, table, graphs. (K3, Al)

413-K. Braze-Welding Rods Are All-Purpose Tools. Joseph Imperati. *Welding Engineer,* v. 40, Sept. 1955, p. 26-28.

Use in a wide variety of fabrication and maintenance purposes. Photographs. (K2, TS, Cu)

414-K. (German.) **Prestressed Bolts in Steel Construction.** O. Steinhardt. *VDI Zeitschrift,* v. 97, no. 21, July 21, 1955, p. 701-708.

Experiments indicate that replacement of riveted or welded joints by joints formed with prestressed bolts improves the fatigue-stress resistance of large steel structures. Tables, diagrams, chart, photograph. 1 ref. (K13, Q7, ST)

415-K. (Spanish.) **Basic Electrodes.** José Callejo. *Ciencia y técnica de la Soldadura,* v. 5, no. 24, May-June 1955, 18 p.

Study of a new type of electrode with low hydrogen content, applications and methods of use on high carbon steels, welding of soft-steel constructions and iron castings. Tables, graphs, photographs, diagrams. (K1, CN, SS, Fe)

416-K. (Spanish.) **Regulating the Voltage and Improving the Power Factor**

in **Resistance-Welding Machines.** R. de Heredia Scasso. *Ciencia y técnica de la Soldadura,* v. 5, no. 24, May-June 1955, 8 p.

Calculation and mounting of series capacitors in above machines. Graphs, diagrams. 3 ref. (K3)

417-K. (Spanish.) **The Use of Different Fluxes in the Welding of Copper.** R. Mearin. *Ciencia y técnica de la Soldadura,* v. 5, no. 24, May-June 1955, 4 p.

Five different fluxes studied to determine most desirable for obtaining a welded joint with the least quantity of oxygen along the seam. Micrographs. (K1, Cu)

418-K. (Spanish.) **What Is Welding?** A. Vollmaier. *Ciencia y técnica de la Soldadura,* v. 5, no. 24, May-June 1955, 12 p.

Various fields of application of electric arc welding. Graphs, diagrams, photographs. (K1)

419-K. (Pamphlet.) **Welding and Brazing. A Bibliography of Unclassified Report Literature.** Gifford A. Young, compiler. TID-3059. 46 p. 1955. U. S. Government Printing Office, Superintendent of Documents, Washington 25, D. C. $0.30.

Annotated list of 226 reports as of Oct. 1, 1954 with data on welding and brazing of ten metals of A.E.C. interest. (K general)

420-K. (Book.) **Brazing Manual.** 193 p. 1955. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $4.75.

A complete handbook limited to industrial applications involving brazing metal-to-metal assemblies. The material is devoted to principles, equipment, and procedures involved in all eight brazing processes, to precleaning, surface preparation, post braze cleaning and inspection, and to techniques of brazing various metals. (K8)

421-K. (Book.) **Symposium on Adhesives and Sealants in Aircraft Applications.** Papers individually paged. Society of Automotive Engineers, 29 West 39th St., New York 18, N. Y.

Four papers from a symposium on theories and fundamentals of various adhesives and sealants used in the aircraft industry. Papers are individually abstracted. (K12)

422-K. Toroidal-Type Current Meter Improves Weld Quality. Paton M. Zimmerman. *General Motors Engineering Journal,* v. 2, Sept.-Oct. 1955, p. 11-14.

Development and performance of a meter which provides a simple and convenient means of measuring actual welding current at electrode tips of welding machine. Photographs, diagram. (K3)

423-K. Resistance Welding Simplifies Presswork. J. H. Bauer. *Iron Age,* v. 176, Sept. 8, 1955, p. 80-81.

Seam welding eliminates deep drawing operations and permits savings in sheet steel. Photographs. (K3, ST)

424-K. Induction Machine Pressure Welds Shafts Without Flash. D. L. Hansen. *Iron Age,* v. 176, Sept. 15, 1955, p. 144-145.

Special machine joins cupped ends, speeds production, eliminates flash problem. Photographs. (K6, ST)

425-K. Solderability: Many Factors Affect Joint Quality. Harry Schwartzbart. *Iron Age,* v. 176, Sept. 22, 1955, p. 110-113.

Covers wettability, temperature, time, capillarity and surface roughness of base metal. Photograph, graphs, diagram. 9 ref. (K7)

426-K. Field Welding on Oilfield Tubular Goods. J. N. Biron and B. G. Frazier. *Journal of Petroleum Technology,* v. 7, Sept. 1955, p. 29-32.

Nontechnical approach to effects of welding oil-well equipment shows that such steels require a stricter procedure for quality welds than steels in general industrial use; recommendations are made accordingly. Photographs, tables, graphs. 2 ref. (K general, AY)

427-K. Welding Comes of Age—New Applications. John L. Lang. *Mechanical Engineering,* v. 77, Sept. 1955, p. 782-784.

New and larger applications of the several electric welding processes. Photographs. (K1)

428-K. Principles of Production Welding. Morris D. Thomas. *Mechanical Engineering,* v. 77, Sept. 1955, p. 785-788.

Seven steps to successful production outlined and discussed. Photographs. (K1)

429-K. Special Techniques Braze Leakproof Aluminum Manifolds. Nagle V. Gusching and John Obrebski. *Metalworking Production,* v. 99, Sept. 2, 1955, p. 1557-1560.

Equipment and techniques for joining channelled "sandwiches" of aluminum for hydraulic manifolds. Photographs, diagrams. (K8, Al)

430-K. Mild Steel Welding in Carbon Dioxide Atmospheres. R. W. Tuthill. *Welding and Metal Fabrication,* v. 23, Sept. 1955, p. 335-338.

Methods, equipment, applications. Photographs, graphs. (K1, CN)

431-K. (Czech.) **Welding of Aluminum and Copper by Low-Temperature Heat and Pressure.** Jiri Hoskovec and Vaclav Pilous. *Zvaranie,* v. 4, no. 5, May 1955, p. 150-155.

Transition pieces of the metals are carefully heated to a little below the melting point of aluminum and finely pressed together. Diagrams, photographs, table. (K5, Al, Cu)

432-K. (Czech.) **Program for the Production of Filler Materials for Electric Arc and Flame Welding.** Antonin Kleander. *Zvaranie,* v. 4, no. 6, June 1955, p. 169-186.

Czechoslovak standards for welding rods, wires and electrodes, including welding properties, techniques, fluxes, strength standards of resulting welds, structures and metals, and where a particular welding electrode is to be used. Tables. (K1, K2, ST, AY)

433-K. (Russian.) **Continuous Flash Welding of Boiler Pipe of Low-Carbon and Low-Alloyed Steel.** N. S. Kabanov and E. S. Slepak. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 1-3.

Relation between impact strength of metal, in welded union, to various factors; comparison of distribution of impact strength when continuous flash welding is used and when there is preheating; other mechanical properties of the steel tubing and its microstructure. Graphs, tables, micrographs. 1 ref. (K3, Q6, M27, ST)

434-K. (Russian.) **Effect of the Direction of the Welding Current on the Formation of the Molten Zone of a Spot-Welded Joint.** N. Kh. Andreev. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 4-6.

Factors affecting choice of polarity in spot welding various alloys on d.c. machines; macrostructure of cores in fused zones. Photographs, diagrams. (K3, M28, Mg)

435-K. (Russian.) **Cooling Thin Steel Sheets in the Case of Spot Welding.** S. A. Adasinskii. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 6-8.

Calculations of very rapid cooling required after current is turned off; effect of factors such as contact time; heat distribution in the cross section. Diagrams, graphs. 4 ref. (K3, ST)

436-K. (Russian.) **Some Laws on Element Transfer From the Electrode Coating Into the Metal Weldment.** V. A. Lapidus. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 14-16.

Transfer of tungsten, chromium, vanadium and carbon in relation to the marble ($CaCO_3$) content of the electrode covering. Tables, graphs. 3 ref. (Kl, W, Cr, V)

437-K. (Russian.) **Arc Welding of Copper by Copper Electrodes.** I. P. Doronin and V. M. Sventitskii. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 17-19.

Advantages over gas welding, including minimizing porosity in welded seams; use of silicon-manganese-aluminum alloy (simanal) as deoxidizing agent and other substances; strength, microstructure, other properties of weld. Tables, photographs. 3 ref. (K1, Cu)

438-K. (Russian.) **Investigation of the Butt-Welding of Tubing Made From Steels 12X5MA and 1X18H9T.** F. I. Kisliuk. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 20-23.

Welding conditions recommended for heat treated and non heat treated joints; resulting mechanical properties and corrosion resistance. Tables, graphs, photographs. (K1, AY)

439-K. (Slovak.) **Effect of Certain Factors on the Welding Properties of Coatings and Fluxes.** Jan Wegrzyn. *Zvaranie,* v. 4, no. 5, May 1955, p. 136-141.

Classification of coatings and fluxes, according to physical, chemical and metallurgical properties; effect of silicon dioxide on notch toughness of resulting weld; effects of oxides of calcium, manganese, iron and magnesium, sodium and potassium; degree of basicity or acidity of fluxes; ionization capacity; other properties. Photographs, oscillograms, tables. (K1, ST)

440-K. **Static and Fatigue Strength of Fillet-Weld Connections Between Rolled Angle Sections and Gusset Plates.** F. Koenigsberger and H. W. Green. *British Welding Journal,* v. 2, Sept. 1955, p. 369-372.

Whereas proportioning of welds is of no consequence, position of welds may influence fatigue strength. Diagrams, photographs, table, graph. 3 ref. (K9, Q7, ST)

441-K. **Some Applications of Welding in the Development of Atomic Energy.** L. Rotherham. *British Welding Journal,* v. 2, Sept. 1955, p. 377-383.

Review of Britain's atomic energy factories, descriptions of method for pressure welding of stainless steel pipe and technique for positional welding of aluminum pipe. Diagrams, photographs. (K general, Al, SS)

442-K. Lead-to-Pin Soldering by Resistance and Conduction Methods. Donald L. Driscoll. *Electrical Manufacturing,* v. 56, Oct. 1955, p. 168-170.

Comparative applications of both techniques to the soldering of typical connectors shows results in favor of resistance methods. Principal benefits include improved joint quality, lower production costs, increased operator safety. Photographs, table. (K7)

443-K. Shop Fabrication of Welded Steel Water Mains. H. C. Von Blohn. *Iron and Steel Engineer,* v. 32, Sept. 1955, p. 106-110; disc., p. 110-111.

Submerged arc welding enables fabrication of large diameter pipe and fittings. Photographs. (K1, F26, ST)

444-K. Maintenance Welding of Heavy Sections. R. E. Metius. *Iron and Steel Engineer,* v. 32, Sept. 1955, p. 113-118; disc., p. 118.

Electric welding has progressed from last-resort method of repair to first-resort maintenance tool. Article discusses many applications. Photographs, diagrams. (K1, ST)

445-K. Induction Brazing. I. D. Warburton Brown. *Machinery Lloyd (Overseas Ed.),* v. 27, Sept. 10, 1955, p. 77-80, 84.

Discusses other methods including torch, furnace, salt bath, dip and resistance brazing. (To be continued.) (K8)

446-K. How Welded Chain Is Tested. H. F. Reid, Jr. *Materials & Methods,* v. 42, Sept. 1955, p. 114-116.

Both destructive and nondestructive tests are used to assure top quality and uniformity of materials. Photographs. (K9, S13)

447-K. Selection of Electrodes for Manual Arc Welding of Low-Carbon Steel. *Metal Progress,* v. 68, Aug. 15, 1955, p. 158-168.

Factors in selection (e.g., composition, thickness, layout, speed of welding, and economics). Tables, diagrams, graphs. (K1, CN)

448-K. Welding and Joining. A. B. Kinzel. *Metal Progress,* v. 68, Sept. 1955, p. 129-132.

Trends and future prospects. The specialty welding of 25 years ago has become routine, the submerged arc and inert gas-shielding have sparked a minor revolution in the industry, new design concepts have resulted from welding research. Photographs. (K general)

449-K. Tig Welding Zinc Alloys. Lloyd Joy. *Welding Engineer,* v. 40, Oct. 1955, p. 47-48.

Tungsten inert-gas process uses alternating current with superimposed high-frequency stabilization. Photographs. (K1, Zn)

450-K. Filler Metals for Joining. Orville T. Barnett. *Welding Engineer,* v. 40, Oct. 1955, p. 49-51.

Properties, composition and advantages of various welding electrodes for joining steel. Tables. (K1, ST)

451-K. Consumable-Electrode Inert-Arc Spot Welding. R. L. Hackman. *Welding Journal,* v. 34, Sept. 1955, p. 839-845.

Process, advantages and limitations, applications, usefulness in terms of material types and thicknesses. Photographs, graphs. (K3)

452-K. Metallurgical Aspects of Silver Brazing Titanium. N. A. Tiner. *Welding Journal,* v. 34, Sept. 1955, p. 846-850.

Covers the inert-gas-shielded radiant-heat, induction and inert-gas tungsten-arc brazing processes. Photograph, graph, micrographs. 5 ref. (K8, Ag, Ti)

453-K. Spot Welding of Structural Applications in Airframe Manufacturing. W. R. Gain. *Welding Journal,* v. 34, Sept. 1955, p. 851-860.

High quality and consistency are assured through understanding of and careful adherence to procedures developed over years of investigations and research. Photographs, oscillographs, graphs, table, diagrams. 3 ref. (K3)

454-K. Evaluation of Fuels and Oxidants for Welding and Associated Processes. W. B. Moen and J. Campbell. *Welding Journal,* v. 34, Sept. 1955, p. 870-876.

An improved method of comparing and evaluating combinations for gas heating applications. Product of normal burning velocity and heating value of combustible mixture is a more significant parameter than flame temperature. Graphs, tables. 9 ref. (K2)

455-K. Welding of Chrome-Moly Steels in High Pressure High-Temperature Service. C. D. Cooper. *Welding Journal,* v. 34, Sept. 1955, p. 882-884.

Designed for reverse polarity, direct current welding in all positions. Photographs. (K1, AY)

456-K. A Comparative Study of European Welding Operations. R. W. Clark, S. A. Greenberg and C. E. Jackson. *Welding Journal,* v. 34, Oct. 1955, p. 935-953.

Report of three United States

members of mission which spent four weeks visiting plants and conferring with welding experts in 11 European countries. Photographs. (K general)

457-K. High-Speed Welding of Gage Material. R. A. Kubli and T. J. McElrath. *Welding Journal,* v. 34, Oct. 1955, p. 978-987.

Submerged arc welding and inert gas-shielded processes can be used. Photographs, graph, diagram. (K1)

458-K. Nitrogen Effects in Argon Arc Welding Atmospheres. H. C. Ludwig. *Welding Journal,* v. 34, Sept. 1955, p. 409S-414S.

High argon purity is required for shielding steel welding arcs. Graphs, table, micrographs. 6 ref. (K1, ST)

459-K. Initial Characteristics of Chromium-Nickel Steel Weld Metals. J. Heuschkel. *Welding Journal,* v. 34, Oct. 1955, p. 484S-504S.

Controlled temperature unnotched tensile test used to study high-temperature brittleness of weld metals which may, under adverse conditions, lead to microfissuring, cracking or even rupturing. Photographs, tables, micrographs, graphs. 20 ref. (K9, AY)

460-K. Effects of Interstitial Elements on Weldability of Titanium Alloy Sheet. II. H. M. Meyer. *Welding Journal,* v. 34, Oct. 1955, p. 505S-517S.

Carbon, nitrogen and oxygen impair weldability under some conditions. Tables, micrographs, graphs. 9 ref. (K9, Ti)

461-K. Effect of Solubility of Alloying Elements Upon Weld Hot Cracking. B. I. Medovar. *Henry Brutcher Translation No.* 3554, 15 p. (From *Avto maticheskaya Svarka,* v. 8, no. 2, 1955, p. 79-90.) Henry Brutcher, Altadena, Calif.

Correlation of equilibrium diagrams with the effect of alloying elements upon the hot cracking tendency of low-carbon 18-8 and 25-20 steels and effect of titanium, zirconium and aluminum upon hot cracking tendency of welds in high nickel steels and alloys. Graphs, micrographs. 18 ref. (K9, M24, AY, SS)

462-K. (Czech.) **Cold Pressure Welding of Aluminum and Copper.** V. Pilous and J. Hoskovec. *Strojirenstvi,* v. 5, no. 3, Mar. 1955, p. 204-212.

Factors controlling welding results, design of welding stamps, methods of cleaning parts, pressure, temperature and speed of welding, previous heat treatment, mechanical tests of welded joints, corrosion and metallographic tests and theory. Diagrams, graphs, tables, micrographs, photographs. 4 ref. (K5, Al, Cu)

463-K. (French.) **Cold Pressure Welding.** J. Reinhold. *Soudage et Techniques connexes,* v. 9, nos. 7-8, July-Aug. 1955, p. 169-175; disc., p. 175-176.

Principal factors influencing quality of welds and weldability of various metals. Photographs, tables, diagrams. (K5, K9, Al, Cu, Fe)

464-K. (French.) **Welded Bridges in France Since the Liberation.** P. Widman. *Soudage et Techniques connexes,* v. 9, nos. 7-8, July-Aug. 1955, p. 185-198.

Welding equipment used in recent construction of railroad and highway bridges in France. Photographs. (K general, ST)

465-K. (German.) **Modern Testing Method for Glass-Metal Joints by Use of Polarized Light.** H. Herrmann. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 744-747.

Physical fundamentals of optical processes, cause of tension cracking of glass. Graphs, photographs. 9 ref. (K11)

466-K. Joining of Metals. J. P. Moore. *Metal Industry,* v. 87, Sept. 30, 1955, p. 277-281.

Interfacial phenomena, structural changes, corrosion of joints. Diagrams, table. 4 ref. (K general)

467-K. Choose the Right Arc Welding Electrodes. L. K. Stringham. *Steel,* v. 137, Oct. 10, 1955, p. 138-141.

Characteristics of various electrodes; recommended uses. Diagrams, table. (K1)

468-K. Maintenance of Resistance Welding Equipment. I. Jones. *Welding and Metal Fabrication,* v. 23, Oct. 1955, p. 403-405.

Fault location and correction. Diagram, photograph, graph. (K3)

469-K. Basic Shear Strength Properties of Metal-Bonding Adhesives as Determined by Lap-Joint Stress Formulas of Volkersen and Goland and Reissner. H. W. Eickner. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1850, Aug. 1955, 36 p.

Strength tests made of lap-joint specimens of clad T5S-T6 aluminum alloys with various lengths of overlap and various sheet-metal thicknesses. Bonds were made with four adhesives. Graphs, photographs, tables. 10 ref. (K12, Q2, Al)

470-K. (German.) **"Thermit"-Trolley Car Rail Welding Process.** Franz Novotny. *Schweisstechnik,* v. 9, no. 7, July 1955, p. 77-81.

Working process of rail welding by use of thermit steel in liquid form, with emphasis on its advantages. Diagrams, photographs, micrographs. (K4, ST)

471-K. (Russian.) **Some Peculiarities of Welding Cast Austenitic Steels.** K. V. Liubavskii and F. I. Pashukanis. *Svarochnoe proizvodstvo,* 1955, no. 9, Sept., p. 1-6.

Intercrystalline cracking, microstructure of multilayer welding, brittleness, grain coarseness, effect of heat treatment on weld strength. Micrographs, tables, diagrams. 6 ref. (K1, K9, Q23, M27, CI)

472-K. (Russian.) **Methods of Calculating Injector Oxy-Acetylene Welding Torches.** V. D. Nechaev. *Svarochnoe proizvodstvo,* 1955, no. 9, Sept., p. 13-16.

Equations for calculating dimensions of canals, oxygen pressure, and other factors. Diagrams, graphs. (K2)

473-K. (Russian.) **Butt Welding of Electrotechnical Silicon Steel Sheets.** N. S. Kabanov. *Svarochnoe proizvodstvo,* 1955, no. 9, Sept., p. 23-27.

Welding techniques, shielding gases, mechanical tests, microstructure, defects and their elimination. Graphs, micrographs, tables, photographs. (K1, Q general, M27, SG-p)

474-K. Welding of Nickel and High-Nickel Alloys by Inert-Gas Shielded-Arc Processes. J. Hinde and D. R. Thorneycroft. *British Welding Journal,* v. 2, Oct. 1955, p. 411-419.

Heat treatment, preparation and cleaning before welding of nickel alloys in general use in Europe. Tables, photographs, graph, micrographs. 4 ref. (K1, Ni)

475-K. Some Electrical Aspects of Inert-Gas Shielded-Arc Welding. L. H. Orton and J. C. Needham. *British Welding Journal,* v. 2, Oct. 1955, p. 419-426.

Requirements for arc, circuit and electrode; examples for tungsten arc and consumable-electrode processes. Graphs, diagrams, photographs. 16 ref. (K1, W)

476-K. Inert-Gas Shielded-Arc Welding in the Gas-Turbine Industry. F. G. C. Sandiford, R. T. Weatherstone, J. E. Hooper, K. H. McDowell and L. Camidge. *British Welding Journal,* v. 2, Oct. 1955, p. 443-455.

Reviews shortcomings of materials, tooling, technique and equipment; indicates trend over next few years. Photographs, radiographs, micrographs, diagrams. 8 ref. (K1)

477-K. Some Factors Affecting Design of Aluminium-Alloy Fabrications Welded by the Inert-Gas Shielded-Arc Process. A. L. Hale. *British Welding Journal,* v. 2, Oct. 1955, p. 455-458.

Increasing use of aluminum and its alloys in general constructional engineering has caused need for this information. Diagrams. 2 ref. (K1, T26, Al)

478-K. Testing and Inspection of Welds in Aluminium and Aluminium-Alloy Plate Made by the Inert-Gas-Shielded Welding Processes. P. Bradley. *British Welding Journal,* v. 2, Oct. 1955, p. 459-463.

Frequency of defects in vessels, effectiveness of localized repairs. Photographs, micrograph, radiographs. (K1, K9, Al)

479-K. Inert-Gas Shielded Tungsten Arc Welding. J. R. Baker and J. W. Ross. *Canadian Metals,* v. 18, Oct. 1955, p. 52 + 5 pages.

Principles and methods, sources of weld contamination, welding of titanium, and carbon or stainless steel. Photographs. (K1, Ti, CN, SS)

480-K. Induction Soldering of Waveguide Flanges. A. R. Fairchild. *Industrial Heating,* v. 22, Oct. 1955, p. 2002, 2004, 2006.

Tin-soldered brass flanges avoid section distortion that brazing aggravates. Photograph, graphs. (K7, Cu, Sn)

481-K. Induction Brazing. II. D. Warburton Brown. *Machinery Lloyd (Overseas Ed.),* v. 27, Oct. 8, 1955, p. 81-84.

Capillary action, design and strength of joints, protective atmospheres. Diagrams. (K8)

482-K. Connecting Aluminum Conductors by the Koldweld Process. W. A. Barnes. *Modern Metals,* v. 11, Oct. 1955, p. 62, 64, 66-67.

Weld characteristics, types of pressure welds, butt-welding wire, bimetal connectors, test results, cold-welding tools. Photographs. (K5, Al)

483-K. Hidden-Arc Welding Speeds Production. Charles. N. Aronson. *Tool Engineer,* v. 35, Nov. 1955, p. 95-97.

Use justified because of large amounts of welding involved in fabrication of positioners. Photographs. (K1)

484-K. Soldered Connections in Electrical Circuits. A. Z. Mample. *Western Union Technical Review,* v. 9, Oct. 1955, p. 125-136.

Explanations intended to prevent troubles and save money. Graphs, tables. (K7)

485-K. (French.) **The Welding of Aluminum in Inert Atmosphere.** Maurice Michaud. Paper from "Congres International de l'Aluminium". v. II. La société d'Edition et de Documentation des Alliages Légers, p. 157; disc., p. 158.

With this process, either a consumable or nonconsumable electrode may be used. (K1, Al)

486-K. (French.) **Recent Progress in Electric Resistance Welding of Light Alloys.** Georges Moressée. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 159-175; disc., p. 175.

Needed for the air, rail and road transport industries, seam-welded light alloys must not be affected by external factors and should have a thickness of 1/10 to 10 mm. Photographs, diagrams, oscillogram, tables. (K3, EG-a)

487-K. (Russian.) **Flux-Shielded Metal Arc Welding of Steel 16 GNM.** I. L. Brinberg and L. V. Golub. *Svarochnoe proizvodstvo,* 1955, no. 9, Sept., p. 18-21.

Fluxes and welding techniques; microstructure, yield point, yield strength, other mechanical indices of welded specimens, effect of heat treatment. Micrographs, graphs, tables, diagram. 2 ref.
(K1, Q23, M27, ST)

488-K. **Welding of Copper and Copper Alloys.** D. C. Moore and E. A. Taylor. *British Welding Journal,* v. 2, Oct. 1955, p. 427-442.

Conditions for optimum metal transfer in argon; use of nitrogen shielding examined for welding copper. Joint quality assessed by radiographic and metallographic examination and by mechanical tests. Tables, micrographs, radiographs, graph, photographs. 6 ref. (K1, Cu)

489-K. **Techniques for Welding and Brazing Molybdenum.** *Industry & Welding,* v. 28, Nov. 1955, p. 54-56, 59, 89.

Preferred and poor methods of welding molybdenum to itself and metals or alloys with which it readily alloys. Photographs.
(K general, Mo)

490-K. **New Method Solves Problems in Chrome Moly Welding.** Lloyd C. Nesbitt. *Industry & Welding,* v. 28, Nov. 1955, p. 80-82, 85-87.

Produces consistently sound welds of high ductility; reduced heating requirements save time and money. Photographs. (K1, Q23, AY)

491-K. (German.) **Development and Standardization of Welding Tests.** Kurt Kautz. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 274-375.

Recent work and economic value of tests. 6 ref. (K9)

492-K. (German.) **Tear Tests for Welds.** J. Colbus. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 376-383.

Both tear tests with fusion-welded butt joints and notch tear test are used according to German standards. Tables, diagrams, graphs. 3 ref. (K9)

493-K. (German.) **The Determination of Weldability of Light Flat Steels.** F. Eisenkolb. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 404-407.

Tests for behavior under welding conditions and for plasticity of weld seam; investigation of crack sensitivity. Photographs. 17 ref. (K9, ST)

494-K. (German.) **Automatic Welding for Section Construction of an Inland Navigating Boat.** Janos Kenderesi. *Schweisstechnik,* v. 9, no. 8, Aug. 1955, p. 89-92.

Details for section welding of ship. Diagrams, graphs. (To be continued.) (K1, ST)

495-K. (Russian.) **Temperature of Molten Electrode Metal Drops During Arc Welding.** A. A. Erokhin. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 9, Sept. p. 125-136.

Comparison of electrodes with and without flux or coverings, effect of electrode composition and welding conditions, calorimetric measurements. Tables, diagrams. 19 ref. (K1)

496-K. (Russian.) **Macro-Nonhomogeneity in the Chemical Composition of Weld Seam Metal.** G. L. Petrov. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 9, Sept., p. 137-153.

Distribution of carbon, chemical composition change in seam around the line of fusion with base metal, chemical nonhomogeneity in multilayer seams, effect of vanadium and nickel. Diagrams, graphs, micrographs, photograph, tables. 7 ref. (K1, CI, AY)

497-K. (Russian.) **New Machinery Set-Up for Producing Welded Pipe With Spiral Seam.** A. I. Tselikov and A. A. Sarychev. *Stal',* v. 15, no. 9, Sept. 1955, p. 815-820.

Characteristics of machinery used, cutting, feeding and submerged arc welding, mechanical properties of pipes. Photographs, tables.
(K1, Q general, ST)

498-K. (Spanish.) **Appraisal of Welding Transformers.** J. Callejo. *Ciencia*

y técnica de la soldadura, v. 5, no. 25, July-Aug. 1955, 6 p.

Study of characteristics necessary for a transformer to be used in electric arc welding. Graphs. (K1)

499-K. (Spanish.) **Investigation of the Fatigue Strength of the Butt Welded Joints of a Weldable "Lloyd"-Type Spanish Steel.** Z. Garcia Martin. *Ciencia y técnica de la soldadura,* v. 5, no. 25, July-Aug. 1955, 16 p.

Study of fatigue strength, low dynamic bending and tension forces of the base metal; effect of the butt-welded joint and extra thickness of the welding head on this strength. Tables, photographs, graphs. 7 ref. (K9, Q7, Q27, ST)

500-K. (Spanish.) **What Is Welding?** A. Vollmaier. *Ciencia y técnica de la soldadura,* v. 5, no. 25, July-Aug. 1955, 14 p.

Discusses transformers and converters for welding with alternating current and various special welding processes; compares use of different electrodes with alternating and direct current. Diagrams, photographs. (To be continued.) (K1)

501-K. (Book-German.) **Joining and Fastening Elements for Instruments.** Hermann Pöschl. 108 p. 1954. Springer-Verlag, Berlin, Germany.

. Methods and means of connecting and joining different parts in small precision equipment. (K13)

SECTION L

CLEANING, COATING and FINISHING

1-L. Electroformed Gauges and Dies. *Automobile Engineer,* v. 44, Oct. 1954, p. 403-404.

Principle, application, economics and advantages of the method for producing precision cavities in hard nickel. Photographs. (L18, Ni)

2-L. Iriditing Replaces Anodizing at Lockheed. Gilbert C. Close. *Aviation Age,* v. 22 Nov. 1954, p. 148-153.

New treatment for applying a corrosion resistant base coating on aluminum alloys used in aircraft construction. Photographs, tables. (L15, L19, Al)

3-L. Accurate Combustion Control Improves Galvanizing Quality and Economy. *Industrial Heating,* v. 21, Oct. 1954, p. 1963-1964, 1966, 2106.

Outline of process and significance of proper application and control of gas fuel. Photographs, diagrams, graph. (L16, Zn)

4-L. Compact Unit Plates Heavy Ductile Coatings on Steel Wire. Herbert Kenmore. *Iron Age,* v. 174, Nov. 11, 1954, p. 117-119.

Equipment, metal savings and applications. Photographs, graph. (L17, T general, ST, Cu, Ni, Zn, Sn)

5-L. The Silent Enemy. E. A. Stockbower. *Ordnance,* v. 39, Nov.-Dec., p. 502-505.

Coatings for prevention of corrosion of military equipment. Table, photographs. (L general, T2, Al, ST)

6-L. A Practical Application of Electroless Nickel Plating. John D. MacLean and Seymour M. Karten. *Plating,* v. 41, Nov. 1954, p. 1284-1287; disc., p. 1287.

Plates 0.00006 to 0.00008 in. can be deposited in 8 min. with good uniformity. Photographs, diagrams. (L14, Ni)

7-L. Disposal of Plating Wastes at a Silverware Plant. Barnett F. Dodge and Charles A. Walker. *Plating,* v. 41, Nov. 1954, p. 1288-1294; disc., p. 1294-1295.

Removal of contaminants and recovery of silver. Tables, flow charts. (L general, A8, Ag)

8-L. The Technology of Liquid Buffing Compositions. Robert V. Twyning. *Plating,* v. 41, Nov. 1954, p. 1296-1299; disc., p. 1300.

Principles and practices for producing satisfactory finishes. 8 ref. (L10)

9-L. Effect of Anode Composition in Acid Copper Plating. R. P. Nevers, R. L. Hungerford and E. W. Palmer. *Plating,* v. 41, Nov. 1954, p. 1301-1305; disc., p. 1305-1306.

Adding 0.02 to 0.03% of phosphorus to anodes eliminates sludge formation and promotes more efficient deposition. Tables, photograph, micrographs. 3 ref. (L17, Cu)

10-L. Effect of Impurities and Purification of Electroplating Solutions. D. T. Ewing, J. K. Werner, C. J. Owen, W. O. Dow and R. J. Rowe. *Plating,* v. 41, Nov. 1954, p. 1307-1311; disc., p. 1311.

Effects of lead on nickel plate and removal of lead from plating solutions. Tables, graphs. 7 ref. (L17, Ni, Pb)

11-L. (Polish.) **Removal of Scale by High-Pressure Water.** Zygmunt Polek. *Hutnik,* v. 21, no. 6, June 1954, p. 172-176.

Techniques and equipment for scale removal in connection with the rolling of sheet metal. Diagrams. 4 ref. (L12, CN)

12-L. (Russian.) **Problem of Anode Deposits Obtained During the Electrolysis of Silver Salts.** I. M. S. Skanavi-Grigor'eva and I. L. Shimanovich. *Zhurnal Obshchei Khimii,* v. 24, no. 9, Sept. 1954, p. 1490-1495 + 1 plate.

Chemical composition and crystalline structure of deposits on platinum anode. Relation of silver in anode to silver deposited at cathode. Micrographs, tables. 9 ref. (L17, Ag)

13-L. A Report on a Study of Primers for Ferrous Metals in an Atmospheric Exposure. *American Paint Journal, (Convention Daily),* v. 39, Nov. 20, 1954, p. 20 + 6 pages.

Evaluation of properties of a number of primer systems. Tables. (L26, L14, ST)

14-L. Mechanisms of Paint Film Breakdown. *American Paint Journal, (Convention Daily),* v. 39, Nov. 18, 1954, p. 20-29.

Results of 12-month Florida exposure tests on bonderized steel panels. Graphs, tables. (L26, CN)

15-L. Paint Industry Literature Classification. *American Paint Journal, (Convention Daily),* v. 39, Nov. 20, 1954, p. 30-36.

Analysis of variables, coding system, source indexes. Tables, punched card replicas. (L26, U8)

16-L. Corrosion. John Gehant. *American Paint Journal,* v. 39, Nov. 22, 1954, p. 71 + 7 pages.

Surveys latest findings and part coatings play. Table. (L26, R general)

17-L. Shipbottom Paints. W. J. Francis. *American Society of Naval Engineers, Journal,* v. 66, Nov. 1954, p. 857-866.

Past, present and future research and development on anticorrosive and antifouling shipbottom compositions. Photographs. (L26)

18-L. Electrolytic Descaling. F. E. Cook, H. S. Preiser and J. F. Mills. *American Society of Naval Engineers, Journal,* v. 66, Nov. 1954, p. 1005-1050.

Electrical method of rust removal from tanker ship compartments. Graphs, diagrams, tables, photographs. 28 ref. (L13, ST)

19-L. Shop Experience in the Enameling of Aluminum. H. V. Penton. *Ceramic Age,* v. 64, sec. 1, Oct. 1954, p. 52-53.

Processing difficulties and corrective measures. (L27, Al)

20-L. How to Select, Prepare and Apply Colors in Porcelain Enameling. William G. Coulter. *Ceramic Industry,* v. 63, Nov. 1954, p. 92, 107.

Preparation of frits. Effects of temperature on fired color. (L27)

21-L. Lanolin Rust Preventatives. G. F. Wood and A. C. Benson. *Corrosion Technology,* v. 1, Nov. 1954, p. 328-329.

Low-cost coatings can give relatively long-time protection against water, acids, alkalies and salts. Photograph. (L26, ST)

22-L. Contact Rectifiers for Electrolysis Installations. G. Krahl and P. F. Stritzl. *Industrial Chemist and Chemical Manufacturer,* v. 30, Oct. 1954, p. 472-474.

Equipment, comparison with other means of conversion. Photographs, diagrams, graph. (L17)

23-L. Phosphating. R. F. Drysdale. *Institute of Metal Finishing, Bulletin,* v. 4, Autumn 1954, p. 203-218.

Review of modern methods, factors affecting formation and crystal growth of coatings. 11 ref. (L14, ST)

24-L. Organic Protective and Decorative Coatings for Metal Containers. T. G. Green and M. Thomas. *Institute of Metal Finishing, Bulletin,* v. 4, Autumn 1954, p. 227-236; disc., p. 237-238.

Types of lacquers and application methods for use with various foods. Diagram, photograph. 8 ref. (L26, CN)

25-L. Modernized Facilities Plate Gravure Cylinders Better and Faster. J. H. Molitor. *Iron Age,* v. 174, Nov. 25, 1954, p. 96-97.

Copper fluoborate bath gives fine-grained, ductile deposits and cuts plating time. Photographs. (L17, Cu)

26-L. Hard Coatings for Aluminum Alloys. (Digest of "Study of Hard Coatings for Aluminum Alloys", by F. J. Gillig; *WADC Technical Report* 53-151, May 1953 and Supplement I, Oct. 1953.) *Metal Progress,* v. 66, Nov. 1954, p. 162, 164.

Study of the Martin hard coat process to determine effects of coating on mechanical and corrosion properties of various aluminum alloys. (L24, Q general, R general, Al)

27-L. Iridite No. 14 for Protecting Aluminum Alloys. W. Castell. *Modern Metals,* v. 10, Nov. 1954, p. 42, 44-45.

Dip method of chromate conversion coatings gives low-cost corrosion resistance and paint adherence. Photographs. (L16, Al)

28-L. Steel-Container Treatments. I. L. J. Nowacki, E. R. Mueller and R. H. Dent. *Modern Packaging,* v. 28, Nov. 1954, p. 163-166, 246, 248.

Effects of phosphate and other pre-treatments on drum enamels. Salt spray and outdoor weathering tests. Photographs, tables. (To be continued.) (L14, R11)

29-L. Factors Influencing the Efficiency of Electric Infra-Red Drying and Baking. Leo Walter. *Organic Finishing,* v. 15, Nov. 1954, p. 6-9.

Processing sheet metal articles coated with lacquers and varnishes, heat penetration, baking schedules, heating elements and control equipment. Diagrams, graphs, photograph. (L26)

30-L. Surface Coatings for Cans and Tubes. W. E. Allsebrook. *Paint Manufacture,* v. 24, Nov. 1954, p. 384-386.

Requirements for lacquers used to protect tinplate. Problems of coatings for collapsible tubes. Photographs. (L26, CN, Al, Sn, Pb)

31-L. The Direct Application of Finish-Coat Enamels to Sheet Steel. General Considerations. A. W. Murdoch. **Shop Practice.** B. Zick. *Sheet Metal Industries,* v. 31, no. 331, Nov. 1954, p. 939-945.

Development of enamels, metal preparation and details of commercial processes. Table. (L27, ST)

32-L. Coated Containers—You Can Get More Into Them. L. J. Nowacki. *Steel,* v. 135, Nov. 8, 1954, p. 92-93, 114.

Properties and advantages of organic coatings for lining steel drums. Photographs. (L26, CN)

33-L. Bend Around Galvanizing Embrittlement. R. W. Sandelin. *Steel,* v. 135, Nov. 22, 1954, p. 92-94.

Tests show that cold work is cause. Aluminum-killed steel is least susceptible. Photographs, table. (L16, Q23, CN, Zr)

34-L. Relation Between Roughness of Interface and Adherence of Porcelain Enamel to Steel. J. C. Richmond, D. G. Moore, H. B. Kirkpatrick and W. N. Harrison. *U. S. National Advisory Committee for Aeronautics, Report* 1166, 1954, 9 p.

Studies of porcelain-enamel ground coats prepared and applied under conditions that gave various degrees of adherence between enamel and a low carbon steel (enameling iron). Tables, graphs, micrographs. 18 ref. (L27, CN)

35-L. Flow-Coat System at Douglas Gives Uniform Quality Finish on Jet Parts. G. T. Sink and H. W. Nerpel. *Western Metals,* v. 12, Nov. 1954, p. 46-48.

Equipment and procedures in automatic paint line. Photographs, table. (L26)

36-L. Composite Wires by Electroplating. Edward C. Slick. *Wire and Wire Products,* v. 29, Nov. 1954, p. 1324-1326, 1362-1368.

Plating procedures, corrosion resistance, strength and ductility of copper plated steel wire. Photographs, graph. 8 ref. (L17, R general, Q23, Cu, ST)

37-L. (French.) **Boronizing, Siliconizing, and Boro-Siliconizing of Steels by Electrolysis.** P. Blum and J. L. Andrieux. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 679-682; disc., p. 682.

Baths and techniques for various alloy steels, mechanism of double cementation. Tables. 4 ref. (L15, AY)

38-L. (French.) **Two New Results Relative to the Composition of Electropolishing Baths.** P. Brouillet and I. Epelboin. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 693-701; disc., p. 701.

Theory of electrolysis, behavior of electrode layers, and polishing of germanium and platinum. Graphs, micrographs. 7 ref. (L13, Ge, Pt)

39-L. (German.) **Preparative Treatment of Metal Surfaces for Purposes of "Tinning" in the Pouring of Bearing Shells.** Edmund R. Thews. *Metalloberfläche,* Ausgabe A, v. 8, no. 11, Nov. 1954, p. 165-171.

Proper cleaning and tin coating of shell surfaces, fluxes, copper plating of bearing shells, bath compositions and plating conditions, tinning techniques. Diagrams. 5 ref. (L17, L16)

40-L. (German.) **Further Development of the Technique of Metal Spraying.** Hans Reininger. *Metalloberfläche,* Ausgabe B, v. 6, no. 11, Nov. 1954, p. 163-166.

Review of literature on protection against scaling, metal spraying of bearings and repairs by metal spraying. Photographs. 34 ref. (L23)

41-L. (German.) **Zinc Plating and Painting.** Wilhelm Brachmann. *Metalloberfläche,* Ausgabe A, v. 8, no. 11, Nov. 1954, p. 172-176.

Protection against corrosion by combining metallic with nonmetallic protective coatings; methods of securing good adhesion. Photographs. 37 ref. (L17, L26, Zn)

42-L. (German.) **Advances in the Field of Metallizing. Cathode Dispersion, Anode Dispersion, High-Vacuum Vaporization, and Decomposition of Gaseous Metal Compounds.** A. Schwarz. *VDI Zeitschrift des Vereines deutscher Ingenieure,* v. 96, no. 30, Oct. 21, 1954, p. 1009-1013.

Review of literature and description of principles of above methods. 17 ref. (L23, L25, L15)

43-L. (Italian.) **Treatment of Alumi-**

num and Its Alloys by Alternating Current in a Chromic Anhydride Bath. L. Guerreschi. *Alluminio,* v. 23, no. 5, Oct. 1954, p. 515-532.

Conditions for anodizing plates. Tables, diagrams. 24 ref. (L19, Al)

44-L. (French.) **An Improved Barrel Finishing Process.** Sixten Arensten. *Métallurgie et la construction mécanique,* v. 86, no. 9, Sept. 1954, p. 683 + 5 pages.

Treatment of iron, steel and most current metals in industry. Process consists in deburring, finishing, waxing and polishing. Diagrams, photographs. (L10, ST, Fe)

45-L. (Russian.) **Electrodeposition of Chromium.** A. T. Vagramian and D. N. Usachev. *Doklady Akademii Nauk SSSR,* v. 98, no. 4, Oct. 1, 1954, p. 605-607.

Polarization of cathode, current density, reduction rate of chromic acid, electrode potentials. Graphs. 11 ref. (L17, Cr)

46-L. Analysis of Electroplating Solutions. II. Estimation of Boric Acid in the Presence of Nickel and Ammonium Salts. M. R. Verma and K. C. Agrawal. *Electroplating and Metal Finishing,* v. 7, Nov. 1954, p. 403-404.

Analytical techniques. 9 ref. (L17, S11)

47-L. Progress in Vacuum Metallising. *Electroplating and Metal Finishing,* v. 7, Nov. 1954, p. 409-412.

Equipment and techniques for applying metal films to plastics. Photographs, diagram. 2 ref. (L23)

48-L. Good Phosphating Practice. H. A. Holden. *Electroplating and Metal Finishing,* v. 7, Nov. 1954, p. 416-418.

Emphasizes interdependence of various operations. Tables. 2 ref. (L14)

49-L. Selection of Metal Cleaning Methods. *Electroplating and Metal Finishing,* v. 7, Nov. 1954, p. 420-424.

Techniques for cleaning various steel parts. (L10, L12, ST)

50-L. Electrodeposition and the Printing Trade. J. Riley. *Institute of Metal Finishing, Bulletin,* v. 4, Spring 1954, p. 47-62.

Processes used and special requirements. 2 ref. (L24, T9)

51-L. Practical Colour Matching on Anodic Films. A. E. Bratt. *Institute of Metal Finishing, Bulletin,* v. 4, Spring 1954, p. 63-76.

Factors influencing dye behavior and test procedures. (L19, Al)

52-L. Electroless Plating Comes of Age. Abner Brenner. *Metal Finishing,* v. 52, Nov. 1954, p. 68-76; Dec. 1954, p. 61-68.

Details of process, advantages, properties of deposits of nickel and cobalt, equipment, pretreatment, bath characteristics, economics, need of further research. Tables, photographs, graphs. 49 ref. (L14, Ni, Co)

53-L. Tin Plate Production at Kaiser Steel Corp. West Coast Plant. Fred A. Herr. *Metal Finishing,* v. 52, Nov. 1954, p. 77-82, 87.

Equipment for hot dip and electrolytic tinning. Photographs. (L16, L17, Sn, CN)

54-L. Surface Treatment and Finishing of Light Metals. V. Chemical Conversion Coatings. S. Wernick and R. Pinner. *Metal Finishing,* v. 52, Nov. 1954, p. 83-87.

Properties of coatings for aluminum. Graphs, tables. 26 ref. (L general, Al)

55-L. Cathode Efficiency as a Control Factor. J. B. Mohler. *Metal Finishing,* v. 52, Nov. 1954, p. 91-92.

Advantages of low-efficiency baths, control problems, measurements. Diagrams, graph. 2 ref. (L17)

56-L. Rapid Porous Chromium Plating. D. V. Pletnev and V. N. Brusentsova. *Henry Brutcher, Altadena, Calif., Translation no.* 2953, 8 p. (From *Vestnik Mashinostroeniya,* v. 32, no. 2, 1952, p. 37-40.)

Materials, equipment and methods. Table, micrographs. (L17)

57-L. Effect of Thiourea on the Electrodeposition of Copper. L. I. Antropov and S. Ya. Popov. *Henry Brutcher, Altadena, Calif., Translation no.* 3377, 8 p. (Condensed from *Zhurnal Prikladnoi Khimii,* v. 27, no. 1, 1954, p. 55-63.)

Previously abstracted from original. See item 524-L, 1954. (L17, Cu)

58-L. Vinyl-Coated Steel Housings for Business Machines. G. H. Kress. *Electrical Manufacturing,* v. 54, Dec. 1954, p. 115-119.

Characteristics, design problems and applications of new composite materials. Table, photograph, diagrams. (L26, CN)

59-L. Finishing Aluminium Castings. *Industrial Finishing (London),* v. 7, Sept. 1954, p. 116 + 6 pages.

Mechanical, paint, electroplated, anodized and vitreous enamel finishes, and hard surfacing processes. Photographs. 2 ref. (L general, Al)

60-L. Protection by Phosphatising. *Industrial Finishing (London),* v. 7, Nov. 1954, p. 255 + 5 pages.

Industrial application processes for steel and zinc. Photographs. (L14, ST, Zn)

61-L. The Protective Properties of Various Phosphate Coatings on Steel. J. F. Andrew, S. G. Clarke, and E. E. Longhurst. *Journal of Applied Chemistry,* v. 4, Nov. 1954, p. 581-595.

Compares phosphates of iron, manganese, and zinc on steel. Russian spot-test evaluation described. Photographs, tables, graphs, micrographs. 9 ref. (L14, ST)

62-L. Vacuum Metallizing—New Low-Cost Method of Finishing Metal Products. J. Gordon Seiter. *Machine and Tool Blue Book,* v. 49, Dec. 1954, p. 157-168, 170, 172.

Fundamentals, advantages, limitations, recent developments and new applications of this versatile process. Photographs. (L23)

63-L. A Survey of Chromate Treatments. Walter E. Pocock. *Metal Finishing,* v. 52, Dec. 1954, p. 48-51.

Treatments for zinc, cadmium, copper, aluminum, magnesium and their alloys. Photograph. 18 ref. (To be concluded.)
(L14, Zn, Cd, Cu, Al, Mg)

64-L. Ion Exchange a Practical Tool in the Plating Room. R. J. Keating. *Metal Finishing,* v. 52, Dec. 1954, p. 52-55.

Applications include treatment of water, purifying plating baths and recovery of metals from rinse waters and other wastes. Photographs, diagrams. (L17)

65-L. High Speed Brass Plating. Theodore Z. Voyda. *Metal Finishing,* v. 52, Dec. 1954, p. 56-60.

Bath solutions, operating conditions and factors which influence deposition of heavy plates of satisfactory color and buffing characteristics. Tables. 8 ref. (L17, Cu)

66-L. Electrodeposition of the Platinum Metals. E. H. Laister. *Metal Industry,* v. 85, Nov. 19, 1954, p. 427-429.

Processes and applications for plating of platinum, palladium and rhodium. Process characteristics of commercially developed coatings. Photograph. (To be continued.)
(L17, Pt, Pd, Rh)

67-L. Painting of Aluminum and Magnesium. Robert I. Wray. *Metal Progress,* v. 66, Dec. 1954, p. 121-126.

Surface preparation, selection of primer and finish coats and methods of their application. Photographs. (L26, Al, Mg)

68-L. The Sanford Process. John B. Franklin. *Metal Treating,* v. 5, Nov.-Dec. 1954, p. 2-3.

Electrochemical surface oxidation produces thick coatings which are wear and corrosion resistant. Photographs. (L14, Al)

69-L. Aluminum Coating Increases Oxidation and Corrosion Resistance of Steel. *Metal Treating,* v. 5, Nov.-Dec. 1954, p. 11.

Alumicoat process permits use of mild and low alloy steel at temperatures above 1800° F. Table, photograph. (L16, CN, AY, Al)

70-L. Steel-Container Treatments. II. L. J. Nowacki, E. R. Mueller and R. H. Dent. *Modern Packaging,* v. 28, Dec. 1954, p. 145-148, 205-206.

Pretreatment consideration of unlined containers for evaluation of phosphate coatings; reverse-impact and ductility tests to determine the effects of pretreatments on performance of organic linings. Graphs, tables, photograph.
(L14, L26, Q6, CN)

71-L. A Study of Primers for Ferrous Metals in an Atmospheric Exposure. VII. Howard Jerome. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 26, Nov. 1954, p. 1039-1046.

Tabular data presented from seven year project. Paint formulas.
(L26, Fe)

72-L. Research and Development. Anti-Corrosive and Marine Paints. *Paint Manufacture,* v. 24, Dec. 1954, p. 438-440.

Reviews recent progress in use of metallic pigments in protection of steel marine structures. Specialized systems described. Photographs. 27 ref. (L26, R general, ST)

73-L. Corrosion Protection of Modern Aircraft. W. F. Castell. *Plating,* v. 41, Dec. 1954, p. 1409-1414; disc., p. 1415.

Protection of aluminum alloys used in airframes by the Iridite No. 14 process. Photographs, micrographs. (L17, Al)

74-L. A Large-Scale Electroless Nickel Custom Plating Shop. G. Gutzeit and R. W. Landon. *Plating,* v. 41, Dec. 1954, p. 1416-1420; disc., p. 1420-1421.

Techniques and advantages of chemical deposition of nickel on a variety of base metals. Diagrams, photographs. 3 ref. (L14, Ni)

75-L. Brass Plating. K. G. Compton, R. A. Ehrhardt and G. Bittrich. *Plating,* v. 41, Dec. 1954, p. 1431-1439; disc., p. 1439.

Development of solutions for depositing 65 to 75% copper alloy with minimum of composition variation. Graphs, tables. 31 ref.
(L17, Cu, Zn)

76-L. The Throwing Power of Tin and Tin Alloy Plating Solutions. Frederick A. Lowenheim. *Plating,* v. 41, Dec. 1954, p. 1440-1445; disc., p. 1445.

Preliminary results on factors affecting throwing power and characteristics of tin-nickel and tin-zinc processes. Graphs, diagrams, tables. 10 ref. (L17, Sn, Ni, Zn)

77-L. Servo Control in the Electropolishing of Wire and Strip. A. Korbelak and C. M. Rively. *Plating,* v. 41, Dec. 1954, p. 1446-1449.

Principles of system for continuous production of tungsten wire. Photograph, diagrams. 3 ref. (L13, W)

78-L. Methods of Plating Aluminum Die Castings. Lynn Sprague. *Precision Metal Molding,* v. 12, Dec. 1954, p. 63 + 4 pages.

Surface preparation, plating data and kinds of plating for various applications. Photograph. (L17, Al)

79-L. Nickel Plated Aluminum Sheet. J. H. James and Henry Page. *Product Engineering,* v. 25, Dec. 1954, p. 167-170.

Yield strength increases with plating thickness, endurance strength is unaffected, corrosion resistance varies with environment and standard forming and heat treating procedures can be followed very closely. Tables, graphs. 6 ref. (L17, Q23, R general, Ni, Al)

80-L. HAE Coatings for Magnesium. H. A. Evangelides. *Product Finishing,* v. 7, Oct. 1954, p. 54-60.

Bath details, preparatory treatments, operating procedure, advantages and test results of new protective finish. Photographs, diagram. (L17, Mg)

81-L. Cures for Faults in Electroplating: Silver Plating Troubles. H. Prince. *Product Finishing,* v. 7, Oct. 1954, p. 69-71.

Reference tables to variety of finishing problems; suggested corrective measures. Tables. (L17, Ag)

82-L. Marine Finishing Schemes. *Product Finishing,* v. 7, Oct. 1954, p. 72-76, 124.

Fouling problems and corrosion protection for new steel, light alloy and wooden constructions. Tables. (L general, R4, ST, Al)

83-L. When Metal Weds Plastic—A New Material is Born. Samuel W. Baker. *Steel,* v. 135, Dec. 6, 1954, p. 116-119.

Precoating of sheet metal provides a vinyl-metal laminate which can be formed by only slight modifications of conventional practices. Photographs, tables. (L26, CN, Al, Mg)

84-L. (French.) **Surface Preparation of Ferrous Metals.** J. Liger. *Métallurgie et la construction méchanique,* v. 86, no. 10, Oct. 1954, p. 763-767.

Nature of impurities and imperfections that surface preparation tries to eliminate. (To be continued.) (L10, L12, ST)

85-L. (German.) **Siliconizing of Steel as a Solid-State Reaction.** Erich Fitzer. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 455-463.

Literature review and experiments show that it is not possible to form an acid-resistant, adherent, nonporous protective film by solid reaction of steel with silicon. Diagrams, graphs, table, micrographs, photographs. 49 ref. (L15, ST, Si)

86-L. (Polish.) **Surface Flaws of Zinc Coatings on Steel Sheets.** S. Socha and W. Sudlitz. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 247-256.

Causes and preventive measures. Micrographs, diagrams, tables. 15 ref. (L17, L16, CN, Zn)

87-L. (Polish.) **Electrolytic Polishing of Steel Strips.** Z. Wojcik. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 257-263.

Method for carbon steel uses additional contacts and cathodes are placed perpendicular to the steel surface. Tables, graphs, diagrams, photograph. 5 ref. (L13, CN)

88-L. (Spanish.) **Use of Metallizing in the Chemical Industry.** Howard Vanderpool. *Fusion de Metales,* v. 16, no. 6, Nov.-Dec. 1954, p. 25-28.

Use on equipment used in chemical industry as protection against corrosion and to avoid contamination of the product. Table. (L15, L23, R general)

89-L. (Czech.) **Structure of Phosphate Coatings at High Temperatures.** Miroslav Cermak. *Hutnické Listy,* v. 9, no. 8, Aug. 1954, p. 470-474.

X-ray study of zinc phosphate coatings. Structures after heating. Diagram, tables, refractograms, graphs. 6 ref. (L14, M27)

90-L. (French.) **Phosphating of Metals.** Jean Bary. *Métaux, Corrosion-Industries,* v. 29, no. 350, Oct. 1954, p. 399-403.

General review of deep and light phosphating processes. Photographs. (L14, Fe, Zn, Al)

91-L. (Russian.) **Influence of Lithium Ions on the Process of Copper Electrodeposition.** S. V. Gorbachev and R. M. Vasenin. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 10, Oct. 1954, p. 1795-1803.

Effective energy of activation, effects of current density, polarization and concentration of lithium sulfate. Graphs, table. 9 ref. (L17, Cu, Li)

92-L. (Swedish.) **Some Metallurgical Aspects of the Enamelling of Cast Iron.** B. Thyberg. *Gjuteriet,* v. 44, no. 10, Oct. 1954, p. 165-169.

Effects of composition on enameling properties, causes of various defects. 10 ref. (L27, Cl)

93-L. Tin-Zinc Plating. *Aircraft Production,* v. 16, Dec. 1954, p. 497-498.

Plating process developed by the Tin Research Institute. Photograph, diagram. (L17, Sn, Zn)

94-L. Hard Surfacing With Chromium Boride Alloys. *Chemical & Process Engineering,* v. 35, Dec. 1954, p. 395.

Application of the several alloys. Photographs. (L24, Cr)

95-L. Improved Techniques in Corrosion Reduction. L. S. Metcalfe. *Gas Age,* v. 114, Dec. 16, 1954, p. 32-34, 70, 72.

New rust inhibitive primers and finishes not only protect against leading factor in deterioration of steel exposed to atmosphere, but also reduce costs. Photographs. (L14, L26, ST)

96-L. Finishing Parts for Military Airplanes. L. M. Redinbaugh. *Industrial Finishing,* v. 31, Dec. 1954, p. 36 + 6 pages.

Facilities for cleaning and applying protective coatings on aluminum alloy parts of various shapes and sizes. Photographs. (L general, Al)

97-L. The Scientific Basis of Anodic Oxidation Treatments of Aluminium and Its Alloys. P. Lacombe. *Institute of Metal Finishing, Transactions, Advance Copy, no. 1,* v. 31, 1954, 12 p. + 1 plate.

Electrolytic and structural factors influencing growth and properties of anodic films. Micrographs, photographs, graphs, refractogram. 19 ref. (L19, Al)

98-L. Industrial Methods of the Brightening and the Anodic Oxidation of Aluminium and Its Alloys. J. F. G. Herenguel. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 2, v. 31, 1954, 11 p. + 2 plates.

Types of alloys and various finishes in commercial use. Typical defects and their elimination. Micrographs, photographs, graphs. 9 ref. (L19, Al)

99-L. Phosphoric Acid Anodizing of Aluminium and Its Application to Electroplating. R. C. Spooner and D. P. Seraphim. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 3, v. 31, 1954, 18 p. + 5 plates.

Effects of electrolyte concentration, current density, time, temperature and air agitation on coating weight, metal loss, coating ratio and density. Tables, graphs, photographs, micrographs. 14 ref. (L19, L17, Al)

100-L. Electrolytic Polishing and Metal Fatigue. R. Mondon and H. E. Zentler-Gordon. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 4, v. 31, 1954, 13 p.

Electropolishing and electromachining remove compressed layers and reveal true fatigue properties of the metal. Vapor honing can restore the compressed layer. Tables, graphs. 12 ref. (L13, Q7)

101-L. On the Experimental Methods for the Determination of Electrode Polarization. R. Piontelli. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 5, v. 31, 1954, 6 p.

Principles of two arrangements which eliminate errors involved in use of the Luggin-Haber capillary. Diagrams. 6 ref. (L17)

102-L. A Quantitative Adhesion Test for Electrodeposited Chromium. C. Williams and R. A. F. Hammond. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 9, v. 31, 1954, 22 p. + 1 plate.

Development and standardization of test. Influence of base material, cleaning methods, plating conditions and heat treatment on adhesion and strength of deposits on steel. Diagrams, photographs, graphs, tables. 17 ref. (L17, Cr, ST)

103-L. Recent Advances in Tinplate Manufacturing Processes. W. E. Hoare. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 12, 1954, 16 p. + 2 plates.

Production of continuous strip steel, electrolytic tinning and improvements in hot tinning. Photographs, diagrams, table, graph. 8 ref. (L17, F23, Sn, CN)

104-L. Studies of the Action of Organic Compounds at the Surface During the Electrodeposition of Nickel. Henry Leidheiser, Jr. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 14, v. 31, 1954, 16 p. + 1 plate.

Influence of various compounds on grain size, orientation and polarization was studied by X-ray, cathode potential and adsorption studies. Tables, diffractograms, graphs. 7 ref. (L17, Ni)

105-L. Bright Nickel Plating—A Review of Progress. R. B. Saltonstall. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 15, v. 31, 1954, 8 p.

Improvements over past 20 yr., difficulties still to be overcome. 6 ref. (L17, Ni)

106-L. Notes on Cleaning Cycles for Plating. A. Kenneth Graham. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 17, v. 31, 1954, 8 p.

Procedures suitable for cleaning steel, copper and nickel prior to nickel plating. Tables. 4 ref. (L10, L12, CN, Cu, Ni)

107-L. Automotive Organic Finishing. James T. O'Reilly. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 19, v. 31, 1954, 15 p. + 4 plates.

General methods, special applications and future possibilities. Photographs. 1 ref. (L26)

108-L. Organic Finishes on Electroplated Coatings With Special Reference to Adhesion. E. C. J. Marsh. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 22, v. 31, 1954, 16 p.

Effects of various pretreatments for lacquering or enameling on zinc, cadmium, copper, tin, nickel, chromium, silver and gold. Tables. 2 ref.
(L26, L17, Zn, Cd, Cu, Sn, Ni, Cr, Ag, Au)

109-L. Tin-Alloy Plating: American Experience. Frederick A. Lowenheim. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 23, v. 31, 1954, 12 p.

Review of practical experience with tin-zinc, tin-nickel and tin-copper alloys. 26 ref.
(L17, Sn, Zn, Ni, Cu)

110-L. Progress in Tin-Nickel Electroplating. A. E. Davies. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 24, v. 31, 1954, 15 p.

Effects of fluoride concentration and formation of complexes. Suggests modifications of bath compositions. Tables, graphs. 8 ref.
(L17, Sn, Ni)

111-L. The Electrodeposition of Gold and Other Alloys by a New Method. G. E. Gardam and N. E. Tidswell. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 25, v. 31, 1954, 8 p.

Deposit composition can be controlled by use of d.c. pulses and composition of the electrolyte. Tables, graph, diagrams.
(L17, Cu, Au)

112-L. A Laboratory Technique for the Electrodeposition of Manganese on Other Metals. Winifred A. Bell. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 27, v. 31, 1954, 10 p. + 1 plate.

Technique for bright smooth plates on aluminum and steel. Diagram, photograph. 11 ref.
(L17, Mn, Al, ST)

113-L. Unsolved Problems in the Metal Finishing Industry. W. L. Pinner. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 28, v. 31, 1954, 6 p.

Need for reliable corrosion test, process for ductile bright nickel deposit and a satisfactory cyanide-copper electrolyte.
(L general, Cu, Ni)

114-L. The Electrodeposition of Porous Metal. Charles L. Faust and William H. Safranek. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 31, v. 31, 1954, 10 p. + 2 plates.

Production of coherent porous deposits of copper, nickel and zinc by use of colloidal graphite as an addition agent. Photograph, micrographs, graphs, table. 2 ref.
(L17, Cu, Ni, Zn)

115-L. Electroplating With Modulated Current. P. Baeyens. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 32, v. 31, 1954, 24 p.

Production and use of repeated changes in plating current in one electroplating operation. Diagrams, graphs. 110 ref. (L17)

116-L. In-Line Pickling Setup Aids Continuous Production. P. K. Dubin and F. A. Locke. *Iron Age,* v. 174, Dec. 23, 1954, p. 62-64.

New developments permit fume-free integration of pickling in production lines. Photographs, diagram. (L12)

117-L. Surface Treatments Improve Properties, Broaden Uses for Aluminum. II. C. C. Cohn. *Iron Age,* v. 174, Dec. 23, 1954, p. 65-68.

Characteristics and applications of

electric, organic solvent, etching, alkali, acid and ultrasonic cleaning methods. Photographs, tables. (L10, L12, L13, Al)

118-L. Electroplating of Magnesium. Leo D. Goddeyne and Dennis J. Goddeyne. *Light Metal Age,* v. 11, Dec. 1954, p. 30-31, 36.

Process for depositing a copper, nickel and chromium finish on a small, thin-walled part. Photograph. (L17, Mg, Cu, Ni, Cr)

119-L. Brush Plating Now Practical. Marvin Rubinstein. *Materials & Methods,* v. 40, Dec. 1954, p. 98-101.

Improvements in French process permit high-speed plating, high purity of deposits and spot and selective plating. Photographs, table. (L17)

120-L. How to Avoid Titanium Embrittlement During Pickling. H. B. Bomberger, M. B. Vordahl and W. L. Finlay. *Materials & Methods,* v. 40, Dec. 1954, p. 105.

A fluorine acid or salt added to nitric acid is best pickling solution. Photograph, graph. (L12, Q23, Ti)

121-L. Clad and Precoated Metals. Materials & Methods Manual No. 111. John B. Campbell. *Materials & Methods,* v. 40, Dec. 1954, p. 113-128.

Types of materials; advantages and applications; properties, fabrication and costs. Photographs, tables. (L22)

122-L. Electrodeposition of the Platinum Metals. E. H. Laister. *Metal Industry,* v. 85, Dec. 3, 1954, p. 469-470.

Properties and applications of platinum, palladium and rhodium platings. Photograph, table. (L17, Pt, Pd, Rh)

123-L. Phosphate Coatings in the Cold Drawing of Steel Wire. James F. Leland. *Wire and Wire Products,* v. 29, Dec. 1954, p. 1440-1443, 1479-1481.

Advantages and possible applications in American installations. Diagrams. (L14, F28, ST)

124-L. Electrotinning of Copper Wire From the Stannous Fluoborate Bath. A. E. Carlson. *Wire and Wire Products,* v. 29, Dec. 1954, p. 1427-1428, 1488-1490.

Process, equipment and bath compositions; advantages. Photograph, tables. (L17, Sn, Cu)

125-L. (French.) **Influence of Additions of Potassium Chloride on the Overvoltage of Copper in Copper Sulfate Solution.** Minko Balkanski. *Comptes rendus,* v. 239, no. 21, Nov. 22, 1954, p. 1381-1383.

Addition of KCl causes decrease of relative energy of activation. Increase of concentration of K^+ ions decreases degree of hydration of Cu^{++} ions. Graphs, table. (L17, Cu)

126-L. (French.) **Cleaning of Metallic Structures With the Oxyacetylene Torch.** E. Sellier and C. Robeyns. *Ossature métallique,* v. 19, no. 12, Dec. 1954, p. 599-602.

Principle, technique, various applications for derusting sheet steel, cleaning forged or cast pieces, burning of deteriorated paint, etc. Photographs. (L10)

127-L. (German and French.) **Protection Against Corrosion of Light-Metal Constructions.** W. Sandow. *Aluminium Suisse,* v. 4, no. 6, Nov. 1954, p. 193-198.

Different lacquers and coatings as corrosion inhibitors. Table. (L26, Al)

128-L. (German.) **The Problem of Adjusting the Melting Intervals of Ground and Top Enamels in Sheet-Metal Enamelling.** Armin Petzold and Theodor Haase. *Silikattechnik,* v. 5, no. 10, Oct. 1954, p. 426-428.

Experiments on the correlation between fusibility of ground enamel and adhesiveness of top enamel. Graphs, table, diagram. 14 ref. (L27, CN-g)

129-L. (Russian.) **Regularities of Electrolytic Polishing of Duralumin.** A. Sh. Valeev. *Zhurnal Prikladnoi Khimii,* v. 27, no. 8, Aug. 1954, p. 882-890.

Behavior during anodic polishing, in a mixture of phosphoric, sulfuric and chromic acids, and at different anode potentials, current densities and temperatures. Graphs, tables, micrographs. 1 ref. (L13, Al)

130-L. (Russian.) **Electrolytic Polishing of Copper at Low Current Density.** V. A. Dmitriev. *Zhurnal Prikladnoi Khimii,* v. 27, no. 8, Aug. 1954, p. 891-900.

Investigates anodic dissolution of cold rolled and annealed copper in phosphoric acid, with the anode in the horizontal position. Tables, diagram, X-ray diffractograms. 19 ref. (L13, Cu)

131-L. (Russian.) **The Theory of the Throwing Power of Complex Copper Electrolytes.** A. V. Izmailov and S. V. Gorbachev. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1529-1538.

Nature of the throwing power determined by the mechanism of the cathode process and type of polarization. Two types of cathodic-de-

position mechanisms are possible, followed by chemical or concentration polarization. Graphs. 16 ref. (L17, Cu)

132-L. (Russian.) **Theory of the Process of Anodic-Film Formation on Aluminum.** I. V. Krotov. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1550-1554.

New interpretation of mechanism of anodic oxidation indicates process must be considered not only electrochemical, but also colloidal-electrochemical. Diagram. 11 ref. (L19, Al)

133-L. (Russian.) **Problem of the Mechanism of Chromium Electrodeposition.** A. I. Levin and A. I. Falicheva. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1652-1661.

Series of characteristic pecularities of the process explained on basis of theory of direct reduction of chromate atoms on the cathode. Photograph, graphs. 32 ref. (L17, Cr)

134-L. Zinc-Rich Paints. C. Finlay and C. T. Morley-Smith. *Corrosion Technology,* v. 1, Dec. 1954, p. 383-385.

Formulation, application methods, film properties, uses, zinc dust requirements. Tables, photographs, micrograph. (L26, Zn)

135-L. Aluminum Coating on Steel Cuts Corrosion. *Diesel Power,* v. 32, Dec. 1954, p. 29-31.

"Aldip" coating provides low alloy steels with exceptional resistance to chemical and high-temperature corrosion. Ability to treat shapes, after casting or fabrication, promises many advantages in improving life of certain diesel parts. Photographs, table. (L16, AY-n)

136-L. Finish Effects Obtainable on Stainless Steel. Richard E. Paret. *Electrical Manufacturing,* v. 55, Jan. 1955, p. 70-76.

Classifies mill finishes and describes wide variety of surface effects possible through mechanical and chemical treatments. Photographs. (L general, SS)

137-L. Electroplated Applications for Precious Metals. Isidore Cross and Perry J. Sloane. *Electrical Manufacturing,* v. 55, Jan. 1955, p. 96-99.

Desirable properties such as increased wear resistance and oxidation, or uniform conductivity, may be "plated on". Properties of electrodepositions and uses in contacts, wave guides, terminals and springs summarized. Tables, diagrams. 6 ref. (L17, Ag, Cu, Au, Al, Mg, Rh, Zn, Ni, Ru, Pt, Pd, Sn, Cr, Pb, Ti, Hg, Cd, Fe)

138-L. The Effect of Ultrasonic Waves on the Electrodeposition of Copper. W. R. Wolfe, Hyman Chessin, Ernest Yeager and Frank Hovorka. *Electrochemical Society, Journal,* v. 101, Dec. 1954, p. 590-596.

Determination made at frequencies of 200 and 100 kc. per sec. with acid-sulfate plating baths of various concentrations. Effects ascertained in terms of polarization measurements and X-ray diffraction data. Diagrams, graphs, X-ray pattern, Schlieren photographs. 17 ref. (L17, Cu)

139-L. A Theory of the Kinetics of Formation of Anode Films at High Fields. J. F. Dewald. *Electrochemical Society, Journal,* v. 102, Jan. 1955, p. 1-6.

Anodic oxidation of tantalum and aluminum. Graphs. 5 ref. (L19, Al, Ta)

140-L. Etch Primers. E. C. J. Marsh. *Electroplating and Metal Finishing,* v. 7, Dec. 1954, p. 466-468.

Chemistry and mechanism of action, with special reference to adhesion. Compares performance of single pack and two solution-type primers on various metals. Graphs, tables. (L14, Fe, Zn, Cd, Al, Sn, Ni, Cu, Cr, SS, CN)

141-L. High Temperature Ceramic Coatings. Alexander Pechman. *Industrial Finishing (London),* v. 7, Dec. 1954, p. 336-338, 340-345.

Refractories and techniques. Photographs, tables. (L27)

142-L. Steam Oxidizing Provides Better Paint Base. L. E. Raymond. *Iron Age,* v. 175, Jan. 13, 1955, p. 75-77.

Low cost surface treatment for steel and cast iron parts. Photographs. (L12, CI, ST)

143-L. Which Electroplate? J. B. Mohler. *Machine Design,* v. 27, Jan. 1955, p. 179-182.

Factors influencing selection of plated metals. Tables. 5 ref. (L17, Cd, Cr, Cu, Au, Fe, Pb, Ni, Rh, Ag, Sn, Zn)

144-L. Liquid Abrasive Blasting of Springs. H. J. Steel. *Machinery,* v. 61, Jan. 1955, p. 188-193.

Intricate surfaces can be reached, defects removed and fatigue life improved by process. Diagrams, photographs, graphs, table. (L10, Q7)

145-L. Modern Barrel Finishing.

Mechanical World and Engineering Record, v. 134, Dec. 1954, p. 546-547.

Advanced technique assures uniformity of finish with low micro-in. surfaces in addition to being economical in operation. Graph, diagram. (L10)

146-L. Carbide Flame-Plating in Powder Metallurgy. M. A. Teter. *Metal Powder Association, Proceedings,* v. 1, 1954, p. 68-71; disc., p. 71.

Characteristics and applications. (L23, H general)

147-L. Polyethylene Tape for Pipe Coating. Marshall E. Parker. *Petroleum Engineer (Management Ed.),* v. 27, Jan. 1954, p. D28-D30.

New basis for design of cathodic protection systems. Photographs, diagram, tables. (L26, R10, ST)

148-L. A New Solderable Zinc Alloy Plating Process. Edward B. Saubestre and Edwin R. Bowerman, Jr. *Sylvania Technologist,* v. 8, Jan. 1955, p. 3-6.

Zinc alloy with 10% tin alloy provides an inexpensive, rust-resistant coating. Tables. 4 ref. (L17, K7, Sn, Zn)

149-L. (French.) **Study of the Electrolytic Deposition of Zinc in Dilute and Very Dilute Solutions.** Ch. Haenny and P. Reymond. *Helvetica Chimica Acta,* v. 37, no. 7, Dec. 1954, p. 2067-2083.

Kinetics of electrochemical deposition of zinc for solutions whose concentrations varied from 10^{-3} to 10^{-9} molar, using nickel or lead electrodes. Diagram, graphs. (L17, Zn, Ni, Pb)

150-L. (French.) **Influence of the Rate of Withdrawal on the Thickness of the Zinc Film.** A. Gordet. *Métallurgie et la construction mécanique,* v. 86, no. 11, Nov. 1954, p. 877, 879, 881.

Effects of galvanizing variables. Tables. (L16, Zn)

151-L. (German.) **The Enameling of Aluminum and Its Alloys.** Rudolf Märker. *Silikattechnik,* v. 5, no. 11, Nov. 1954, p. 462-464.

Properties of aluminum, usable aluminum materials, composition of enamel, production of enamel coating, properties and application of enameled pieces. Tables. 34 ref. (L27, Al)

152-L. (German.) **Reactions in the Intermediate Stratum Between Iron and Coating Systems and the Effect of Inhibitors.** A. V. Blom. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 425-429; disc., p. 429-430.

Stresses importance of a special surface technology for prolonging life of steel structures and reducing maintenance costs, by close correlation of surface pretreatment and coatings. Tables, diagram. 6 ref. (L general, Fe, ST)

153-L. (Hungarian.) **The Production and Properties of Copper-Coated Aluminum Plate.** Ferenc Köszgi. *Kohaszati Lapok,* v. 9, no. 11, Nov. 1954, p. 520-523.

Review of problems, application of zinc intermediate layer, physical and mechanical properties. Diagrams, tables, micrographs. (L17, P general, Q general, Al, Cu, Zn)

154-L. (Polish.) **Phosphate Treatment of Zinc and Zinc Alloys. II. Anodic Phosphate Treatment of ZnAl Alloys in Alkali Solutions.** J. Kamecki and J. Romanski. *Prace Instytutu Odlewnictwa,* v. 3, no. 3, 1953, p. 92-100.

Effects of bath composition, voltage, time and other variables on quality of phosphate coating. Diagrams, photograph, tables, graphs, micrographs. 23 ref. (L14, Zn, Al)

155-L. (Polish.) **Chromate Treatment fo Zn-Al Alloys.** J. Kamecki and J. Romanski. *Prace Instytutu Odlewnictwa,* v. 4, no. 4, 1954, p. 117-124.

Optimum conditions for good results. Influence of bath composition, time and preparation of metal surface. Tables, graphs, photographs. 43 ref. (L14, Zn, Al)

156-L. (Russian.) **Diffusion Chrome Plating of Steel in a Medium of Chromium Oxide.** G. N. Dubinin. *Vestnik Mashinostroeniia,* v. 34, no. 11, Nov. 1954, p. 56-58.

Experimental data on use of powdered oxides. Tables, micrographs. (L15, Cr, ST)

157-L. Chemical Nickel Coating Boon to Process Equipment. R. W. Glasheen. *Chemical Engineering Progress,* v. 51, Jan. 1955, p. 60-61.

Process shows well on new equipment and in reclaim application; cobalt can also be plated. Photographs, flowsheet. (L14, Co, Ni)

158-L. Temperature Control Key to Longer Pot Life. W. G. Imhoff. *Iron Age,* v. 175, Jan. 20, 1955, p. 92-94.

Zinc attacks iron much faster at temperatures above 900° F. Table, graph, micrographs. (L16, S16, Zn, CN)

159-L. Bronze Plating. Kenneth Rose. *Materials & Methods,* v. 41, Jan. 1955, p. 100-101.

Alloy has excellent bearing proper-

ties, maximum solderability and better corrosion resistance. Photographs, table.
(L17, K7, R general, Cu, Sn)

160-L. Technical Developments of 1954. Nathaniel Hall. *Metal Finishing,* v. 53, Jan. 1955, p. 58-66.

Critical review of papers published during 1954 on cleaning, pickling, polishing and coating of metals. 285 ref. (L10, L11)

161-L. Plating Wastes—A Review of Research. D. Gardner Foulke and Raymond E. Ledford. *Metal Finishing,* v. 53, Jan. 1955, p. 67-75.

Progress made and studies now underway on control of pollution by metal working wastes. Tables, photograph, graphs, diagram. 63 ref. (L general, A8)

162-L. Rinsing Techniques. Joseph B. Kushner. *Metal Finishing,* v. 53, Jan. 1955, p. 76-79.

Requirements of a good rinse, equipment, wetting agents, special techniques. Diagrams, graph. 8 ref. (L17, L12)

163-L. A Survey of Chromate Treatments. Walter E. Pocock. *Metal Finishing,* v. 53, Jan. 1955, p. 80-83.

Advantages and processing methods for coatings on various metals. Photograph, tables.
(L14, Zn, Cd, CN, Al, Cu)

164-L. Surface Coating Applications of Epoxide Resins. R. N. Wheeler. *Paint Technology,* v. 18, Dec. 1954, p. 131-135.

Show greater number of desirable properties than other coatings. Synergistic effect with other resins. Tables. (L26)

165-L. (German.) **Phosphating and Chromating. New Coatings for Aluminum and Its Alloys.** H. Keller. *Aluminium,* v. 31, no. 1, Jan. 1955, p. 4-7.

Review of electrolytic and chemical processes. Photographs, tables. 2 ref. (L14, Al)

166-L. (German.) **A New Process for Improving the Light-Fastness of Organic Dyes on Anodically Oxidized Aluminum.** C. Th. Speiser. *Aluminium,* v. 31, no. 1, Jan. 1955, p. 8-9.

Special sealing process is applied after dyeing. Table. 3 ref.
(L19, Al)

167-L. (German.) **Corrosion Protection of Pure Aluminum, Raffinal, and Some Corrosion Resistant Alloys With Layers of Bohmite.** D. Altenpohl. *Aluminium,* v. 31, no. 1, Jan. 1955, p. 10-14.

Boiling water or steam treatments give coatings with protection value between atmospheric oxidation and anodizing. Graph, table, micrographs. 15 ref. (L14, R3, Al)

168-L. (German.) **Experiences With Nickel Anodes in Electrolytic Baths and Their Uses.** Rudolf Krulla. *Elektrotechnik und Maschinenbau,* v. 71, no. 23, Dec. 1, 1954, p. 560-561.

Factors affecting quality and behavior of nickel anodes. (L17, Ni)

169-L. (German.) **Flame Spraying of Nonmetallic Protective Layers on Metal Surfaces.** Hans Reininger. *Metalloberfläche,* Ausgabe A, v. 9, no. 1, Jan. 1955, p. 6-9.

Review of literature on materials, methods, properties and uses. 36 ref. (L23)

170-L. (Hungarian.) **Micropolishing of Steel and Iron Alloys.** Ferenc Boda and Zoltan Hegedüs. *Kohaszati Lapok,* v. 9, no. 8, Aug. 1954, p. 348-352.

Equipment and operation; composition of electrolytes; methods for various types of steel. Micrographs, photographs, circuit diagram. 11 ref. (L12, L13, ST, Fe)

171-L. (Hungarian.) **Electrochemical Investigation of Corrosion-Inhibitive Phosphate Coatings. I. Study of Cold Phosphating.** Klara Kovacs. *Magyar Kémikusok Lapja,* v. 9, no. 5, May 1954, p. 135-142.

Inhibitive effect, method of application, evaluation, effect of pH, accelerators and concentration of the bath. Graphs, tables. 13 ref. (L14)

172-L. (Russian.) **Investigation of Electrode Processes During Precipitation and Dissolving of Silver in Cyanide Solutions.** A. P. Popkov and A. T. Vagramian. *Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk,* 1954, no. 6, Nov.-Dec., p. 966-971 + 2 plates.

Apparatus for measuring polarization by alternating and impulse currents. Diagram, circuit diagram, graphs. 8 ref. (L17, Ag)

173-L. (Russian.) **Investigation of Electrolytic Deposition of Lead-Tin-Zinc Alloy.** N. A. Solov'ev. *Zhurnal Prikladnoi Khimii,* v. 27, no. 12, Dec. 1954, p. 1263-1268.

Effect of current density on composition and distribution of deposition; effects of content of hydroborofluoric acid and sizing; corrosion rates of items plated with variations of the alloy. Tables. 2 ref. (L17, R general, Pb, Zn, Sn)

174-L. Electrochemistry of Extremely Dilute Solutions and the Role of

Surface Conditions of Electrodes. M. Haissinsky and A. S. Ghosh Mazumdar. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Oct. 1954, p. 5-13.

Mechanisms of electrolytic deposition of metals. Graphs. 4 ref. (L17)

175-L. Studies on Some Operating Variables in Anodizing Process for Reflector Grade Aluminium. A. C. Dutta and B. K. Choudhuri. *Central Electrochemical Research Institute, Karaikudi, Bulletin,* v. 1, Oct. 1954, p. 14-21.

Optimum conditions for producing highly reflective coatings. Graphs, photograph. 10 ref. (L19, Al)

176-L. Chemical Polished Aluminium. R. Pinner. *Electroplating and Metal Finishing,* v. 8, Jan. 1955, p. 4-8.

May replace chromium plate in motor industry because it is cheaper to produce, retains its appearance better on outdoor exposure, does not rust and requires no nickel. Photographs, graphs, tables. 10 ref. (L12, Al)

177-L. The Adhesion of Paints to Metallic Surfaces. C. D. Lawrence. *Electroplating and Metal Finishing,* v. 8, Jan. 1955, p. 14-18.

Tests for underwater paints. Photographs. 5 ref. (L26)

178-L. Peroxygen Compounds Hold Important Place in Treating Metal Surfaces. P. H. Margulies. *Iron Age,* v. 175, Jan. 27, 1955, p. 71-74.

Hydrogen peroxide increases intensity and adherence of black finishes on zinc and cadmium; also useful in combination with ammonium hydroxide for etching, brightening and passivation treatments. Photographs, micrographs, table. (L14, Zn, Cd, Cu, ST, Ni, Pb, Al)

179-L. (Czech.) **Theory of Hot Galvanizing.** Josef Teindl. *Hutnické Listy,* v. 9, no. 12, Dec. 1954, p. 731-737.

Effects of fluxes; structures of coatings; bath additions; protective properties of coatings. Graphs. 23 ref. (L16, Zn, Sn, ST)

180-L. (French.) **Experimental Study and Control of Enamel-Metal Adherence. Application to Steels for Aeronautical Construction and Their Ceramic Protection.** S. J. Tonachella. *Metaux, Corrosion-Industries,* v. 29, no. 351, Nov. 1954, p. 415-430.

Ceramic coatings for gas turbine parts; adherence; preparation of specimens. Diagrams, photographs. (L27, ST)

181-L. (French.) **Descaling of Steel by Means of Oxidizing Pastes.** Jean Frasch. *Metaux, Corrosion-Industries,* v. 29, no. 351, Nov. 1954, p. 438-445.

Chemical, physical and geometrical structure of scale; electrochemical character of chemical descaling. Graph, table. 4 ref. (L12, Fe, ST)

182-L. (German.) **Siliconizing of Steel as Surface Protection. Siliconizing by Means of Volatile Halogen Compounds.** Erich Fitzer. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 601-612.

Experimental study on the reaction and control of silicon halide vapors; formation of Fe_3Si films, and heat-resistant Fe_3Si-free ferritic layers by special heat treatment. Graphs, tables, micrographs, diagrams. 27 ref. (L15, J general, ST, Si)

183-L. (German.) **Depolarization Current and Oxygen Charge of Platinum in Electrolytes Containing Oxygen.** Heribert Grubitsch. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 889-896; disc., p. 897.

Effect of resistance on diffusion current; dependence of holding current upon pH value in air-agitated air-saturated buffer solutions. Graphs. 10 ref. (L17, Pt)

184-L. (Russian.) **Influence of Sodium Ions on the Process of the Electrodeposition of Copper.** R. M. Vasenin and S. V. Gorbachev. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 11, Nov. 1954, p. 1922-1927.

Relation of polarization, current density and effective energy of activation to concentration of sodium sulfate. Electroconductivity of solutions. Graphs, table. 6 ref. (L17, P15, Cu)

185-L. (Russian.) **Influence of Rubidium and Cesium Ions on the Process of the Electrodeposition of Copper.** S. V. Gorbachev and R. M. Vasenin. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 11, Nov. 1954, p. 1928-1934.

Polarization, current density and effective activation energy in relation to concentration of cesium and rubidium sulfates. Graphs, table. 5 ref. (L17)

186-L. How the Small Electroplater Can Treat Cyanide Plating Waste Solutions With Hypochlorites. Barnett F. Dodge and Walter Zabban. *Plating,* v. 42, Jan. 1955, p. 71-75.

Abatement of stream pollution. Diagrams, table. 7 ref. (L17, A8)

187-L. (Book—German.) **Surface Treatment of Ferrous and Nonferrous Metals.** Willi Machu. 801 p. 1954. Akademische Verlagsgesellschaft, Geest & Portig K.-G., Leipzig, Germany.

Covers degreasing, cleaning, pickling, burnishing, polishing, and grinding. (L general)

188-L. Ceramic Coatings for Nuclear Reactors. A Progress Report. Joseph C. Richmond, Henry G. Lefort, Charles N. Williams and William N. Harrison. *American Ceramic Society, Journal,* v. 38, Feb. 1955, p. 72-80.

Study of coatings having low absorption coefficients for thermal neutrons. Designed for application to typical high-temperature alloy parts. Tables, micrographs, graphs. 45 ref. (L27)

189-L. Turbine Blades Clad by Rapid Series-Arc Welding. *Canadian Metals,* v. 18, Feb. 1955, p. 41.

Quickly deposited layer of stainless steel on areas of cast steel blades subjected to wear and corrosion, provides good protection. Photographs. (L24, CI, SS)

190-L. Acid-Truck Painting Cost Cut 85%. *Chemical Engineering,* v. 62, Feb. 1955, p. 218, 220, 222.

Use of neoprene coatings permits lower painting costs, less layup or downtime of tank, longer tank life. Photographs. (L26, R5)

191-L. Determination of Plating Quality. G. Howells. *Corrosion Technology,* v. 2, Jan. 1955, p. 9-12.

Methods of testing for adhesion, porosity, hardness and luster. Tables, diagrams. (L17)

192-L. Deposition of Titanium Coatings From Pyrosols. A. W. Schlechten, M. E. Straumanis and C. B. Gill. *Electrochemical Society, Journal,* v. 102, Feb. 1955, p. 81-85.

Protective titanium films can be deposited on copper and iron in molten salt baths. Mechanism of the titanium transfer. Graphs, micrographs. 8 ref. (L14, Ti, Cu, Fe)

193-L. Advances in Stannate Tin Plating—the Potassium Stannate Bath. J. W. Cuthbertson. *Industrial Finishing (London),* v. 8, Jan. 1955, p. 21-24, 26-27.

Compares sodium with potassium tin plating; applications. Photographs, diagrams, graph, table. 11 ref. (L17, Sn)

194-L. Cold Cleaners Do Effective Job in Still and Spray Tanks. James McElgin. *Iron Age,* v. 175, Feb. 3, 1955, p. 110-112.

Two new cold cleaners, used in combination, effectively remove shop oil and dirt without producing toxic or disagreeable fumes. Photograph, diagrams. (L12)

195-L. Ten Years of Mechanical Descaling of Hot Rolled Steel Products. Gilbert D. Dill. *Iron and Steel Engineer,* v. 32, Jan. 1955, p. 85-89.

Main applications of mechanical blast cleaning. Photographs. (L10, ST)

196-L. Coatings on Molybdenum. Walter Beck. *Metal Industry,* v. 86, Jan. 21, 1955, p. 43-46.

Electrolytic deposition of aluminum, silicon and boron from fused salt baths. Micrographs, graphs, table. 4 ref. (L17, Al, Si, B, Mo)

197-L. The Use of Filters in Electroplating. J. B. Mohler and Charles E. Crowley. *Metal Finishing,* v. 53, Feb. 1955, p. 52-57, 60.

Types of filters and practices for various plating baths. Diagrams, tables. (L17)

198-L. Alkali Metals in Phosphating and Cyanide Plating Baths. Determination by Means of Anion Exchangers. Gunnar Gabrielson. *Metal Finishing,* v. 53, Feb. 1955, p. 58-60.

Analytical procedure. Tables. 7 ref. (L14, L17)

199-L. Anodizing Hollow Objects. William McNeill. *Metal Finishing,* v. 53, Feb. 1955, p. 61-62.

Use of bipolar electrodes to anodize internal surfaces of aluminum and magnesium objects. Graph, diagram, table, photographs. 2 ref. (L19, Al, Mg)

200-L. Surface Treatment and Finishing of Light Metals. V. Chemical Conversion Coatings. S. Wernick and R. Pinner. *Metal Finishing,* v. 53, Feb. 1955, p. 66-72.

Protective values of various coatings on aluminum. Tables, graphs. 21 ref. (L14, Al)

201-L. Electrostatic Finishing of Appliances. *Metal Progress,* v. 67, Feb. 1955, p. 84-86.

Highly mechanized finish line for domestic laundry cabinets. Photographs. (L26)

202-L. Production Plating of Magnesium Die Castings. Leo D. Goddeyne and Dennis J. Goddeyne. *Precision Metal Molding,* v. 13, Feb. 1955, p. 59-60, 62-63.

Procedures for development of a

chromium finish. Photograph.
(L17, Mg, Cr)

203-L. Notes on Electroplating Metallized Surfaces. Samuel Wein. *Products Finishing,* v. 19, Feb. 1955, 24 + 6 pages.

Materials and methods for plating of copper, nickel, iron, gold and silver. Tables.
(L17, Cu, Fe, Ni, Au, Ag)

204-L. Evaluation of Aluminum Cleaners for Resistance Welding. W. B. Stephenson, Jr. *Steel Processing,* v. 41, Jan. 1955, p. 31-33.

Comparison of proprietary cleaners shows that overprocessing may be objectionable. Photographs, graphs. (L10, K3, Al)

205-L. Some Aspects of the Electrodeposition of Titanium and Zirconium Coatings. R. M. Creamer, D. H. Chambers and C. E. White. *U. S. Bureau of Mines, Report of Investigations* 5093, Dec. 1954, 39 p.

Developments in use of aqueous, nonaqueous, and fused-salt electrolytes. Tables. 28 ref. (L17, Ti, Zr)

206-L. High Nickel Overlays on Ferrous Metals. G. R. Pease, H. B. Bott and H. G. Waugh. *Welding Journal,* v. 34, Jan. 1955, p. 40-48.

Effects of iron dilution on mechanical properties of high-nickel alloys deposited on steel; control of arc-welding process. Photographs, tables, diagram. 1 ref.
(L24, K1, Q general, Ni, CN)

207-L. Intensified Attack of Molten Zinc on Iron at About 930° F. D. Horstmann. *Henry Brutcher Translation no.* 3290, 9 p. Henry Brutcher, Altadena, Calif. (Slightly abridged from *Archiv für das Eisenhüttenwesen,* v. 25, nos. 5-6, 1954, p. 215-219.)

Previously abstracted from original. See item 680-L, 1954.
(L16, Fe, Zn)

208-L. Mechanism of Electrodeposition of Chromium. A. I. Levin, A. I. Falicheva, E. A. Ukshe and N. S. Brylina. *Henry Brutcher Translation no.* 3315, 8 p. Henry Brutcher, Altadena, Calif. (From *Doklady Akademii Nauk SSSR,* v. 95, no. 1, 1954, p. 105-108.)

Previously abstracted from original. See item 501-L, 1954. (L17, Cr)

209-L. On the Theory of the Deposition of Chromium From Aqueous Chromic Acid Solutions. I-II. E. Müller. *Henry Brutcher Translation nos.* 3320-3321, 33 p. (From *Archiv für Metallkunde,* v. 2, no. 4, 1948, p. 110-120.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 8-161, 1949. (L17, Cr)

210-L. Attack on Iron-Saturated Molten Zinc on Iron as Affected by an Antimony Content. D. Horstmann. *Henry Brutcher Translation no.* 3407, 11 p. (Slightly abridged from *Archiv für das Eisenhüttenwesen,* v. 25, nos. 5-6, 1954, p. 207-213.) Henry Brutcher, Altadena, Calif.

Antimony is an undesirable addition to the zinc bath and large quantities only serve to widen the temperature range of attack. Tables, graphs, micrographs, 6 ref.
(L16, Sb, Zn, Fe)

211-L. Absorption of Hydrogen by Austenitic Steels Under Cathodic Loading. F. Eisenkolb and G. Ehrlich. *Henry Brutcher Translation no.* 3412, 24 p. (Slightly abridged from *Archiv für das Eisenhüttenwesen,* v. 25, nos. 3-4, 1954, p. 187-194.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 492-L, 1954. (L17, AY)

212-L. Deposition of Bright Nickel Plates From Ammoniacal Solutions. N. A. Izgaryshev, N. T. Kudryavtsev and E. V. Morozov. *Henry Brutcher Translation no.* 3423, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 96, no. 1, 1954, p. 143-144.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 636-L, 1954. (L17, Ni)

213-L. (French) **Weld Deposition and Its Applications in Industry.** Adolphe Luthy. *Métallurgie et la construction mécanique* v. 86, no. 12, Dec. 1954, p. 945-947, 949-951.

Techniques, possibilities and various uses. Photographs.
(L24, Cr, W, Ni, Co, V)

214-L. (French.) **Electrodeposits of Zinc.** *Métallurgie et la construction mécanique,* v. 86, no. 12, Dec. 1954, p. 967, 969.

Use of alkaline baths; preparation of pieces; operation of bath.
(L17, Zn)

215-L. (German.) **Pickling Thin Sheet Metals Under the Influence of Sonic Energy.** W. Meiswinkel. *VDI Zeitschrift,* v. 97, no. 2, Jan. 11, 1955, p. 42-46.

Reduction of pickling time and acid consumption by subjecting sheet metals to sonic frequencies. 24 ref. (L12, Fe, ST)

216-L. (Russian.) **Chemical Nickel Coating.** S. M. Panchenko and M. A. Krokhina. *Vestnik Mashinostroeniia,* v. 34, no. 12 Dec. 1954, p. 68-70.

Theoretical bases of method; prac-

tical applications; optimum conditions; comparison with electrolytic deposition process. Graphs, tables. 3 ref. (L14, Ni)

217-L. Suggested Guide to Laboratory Metal Cleaning. J. C. Harris, W. Stericker and S. Spring. *ASTM Bulletin,* 1955, no. 204, Feb., p. 31-34.
Soils, cleaning agents, procedures. Tables. 3 ref. (L12)

218-L. Use of Cast-Iron Ground-Coats. P. Rogers. *Foundry Trade Journal,* v. 98, Feb. 3, 1955, p. 121-123.
Various types of enamel bases. (L27, CI)

219-L. Polishing of Metal by the Barrelling Process. L. Mable. *Institute of Metal Finishing, Bulletin,* v. 4, Winter 1954-1955, p. 289-298.
Equipment and processes for deburring, cleaning and polishing. Photograph. (L10)

220-L. Molybdenum Deposition on Titanium. Sam Tour, Andre Styka and George Fischer. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p, 291-296.
Hard, adherent and wear-resistant coatings are vapor deposited without changing microstructure of the titanium. Diagram, tables, micrographs. 4 ref. (L25, Mo, Ti)

221-L. New Solution Ceramic Coatings. Kenneth Rose. *Materials & Methods,* v. 41, Feb. 1955, p. 107-108.
Water solutions (not suspensions) of metallic salts are sprayed followed by warming sufficiently for drying. Coating resists heating and corrosion. Photographs. (L27)

222-L. Bumper Guards. Processing Know-How Results in Superior Finished Product. Max Weinberg and Al Lake. *Plating,* v. 42, Feb. 1955, p. 144-146, 159, 179.
Interdependence of drawing, polishing and plating processes in obtaining a good finish. Photographs. (L17, G4, CN)

223-L. The Plating of Powder-Metallurgy Bronze Parts. E. V. Raymond, R. T. Foley, and W. L. Chu. *Plating,* v. 42, Feb. 1955, p. 150-151.
Oil impregnation before plating found beneficial in producing a good tin plate on sintered bronze. Micrographs. 6 ref.
(L17, H16, Cu, Sn)

224-L. The Influence of the Physical Metallurgy and Mechanical Processing of the Basic Metal on Electroplating. I. Critical Review of the Literature. A. E. R. Westman and F. A. Mohrnheim. *Plating,* v. 42, Feb. 1955, p. 154-158, 195.
Influence of steel properties on characteristics of electrodeposited nickel-chromium coatings. Diagrams. 75 ref. (L17, ST, Ni, Cr)

225-L. Cures for Faults in Electroplating. Zinc Plating Troubles. J. H. Collins. *Product Finishing,* v. 7, Sept. 1954, p. 50-54.
Problems and their recommended cures in acid zinc and cyanide zinc plating. Tables. (L17, Zn)

226-L. The Use of Melamine Resins in Organic Protective Coatings. I. Greenfield. *Product Finishing,* v. 7, Sept. 1954, p. 61-68.
Melamine properties, production methods, formulation, advantages, application methods and uses. Photographs, structural formulas. (L26)

227-L. Correct Abrasive Selection in Blast Cleaning Metals. V. F. Stine. *Steel Processing,* v. 41, Feb. 1955, p. 100-103.
Characteristics of various abrasive materials, equipment factors, important uses. Tables, photographs. (L10)

228-L. (French.) **Experimental Study and Control of Enamel-Metal Adherence. Application to Aeronautical Construction Steels and to Their Ceramic Protection.** S. J. Tonachella. *Metaux, Corrosion-Industries,* v. 29, no. 352, Dec. 1954, p. 483-509.
Results of adherence tests, influence of metal surface state, influence of different alloys, dilatometrics of metallic and ceramic materials, influence of additions, tests on refractory alloys. Tables, graphs. 39 ref.
(L27, CN, Ni, AY, Cr, Co, Ti, W)

229-L. (German.) **Corrosion Protection of Pure Al, Riffinal and Reflektal.** D. Altenpohl. *Aluminium,* v. 31, no. 2, Feb. 1955, p. 62-69.
Chemical resistance of various oxide films, method of producing Böhmite films. Tables, graphs. 21 ref. (L14, Al)

230-L. (German.) **Conditions of Deposition and Structure of Compact Electrolytic Metal Deposits. II. Electrolytic Nickel Deposits in the Range of the FT and UD Type.** J. Elze. *Metall,* v. 9, nos. 3-4, Feb. 1955, p. 104-109.
X-ray and metallographic studies of the effect of electroplating conditions on the structures of nickel deposits. Tables, micrographs. graphs. 14 ref. (L17, M27, Ni)

231-L. (German.) **Economical Pick-**

ling in Theory and Practice. A. Pollack. *Metalloberfläche,* Ausgabe A, v. 9, no. 2, Feb. 1955, p. 17-22.

Review of literature on methods and equipment. Photographs. 51 ref. (L12)

232-L. (German.) **Patents on Chemical and Electrochemical Polishing and Brightening of Metal Surfaces Since 1940.** Hermann Baur. *Metalloberfläche,* Ausgabe A, v. 9, no. 2, Feb. 1955, p. 22-28.

Patent numbers, dates, polishing solutions, additives, polishing temperatures and currents for polishing ferrous and nonferrous metals and alloys. Tables. (L12, L13)

233-L. (German.) **Comparative Investigations of Layer-Thickness Measuring Processes.** Herbert Barghoorn. *Metalloberfläche,* Ausgabe B, v. 7, no. 2, Feb. 1955, p. 20-25.

Destructive and nondestructive methods of measuring the thicknesses of deposits on metals; sources of error. Diagrams, tables, graph. (To be continued) (L17, S14)

234-L. (German.) **Chemical or Mechanical Descaling of Steel Bars?** Otto Peltzer. *Stahl und Eisen,* v. 75, no. 3, Feb. 10, 1955, p. 129-140.

Cost comparisons of shot blasting versus pickling. Photographs. diagrams. 20 ref. (L10, L12)

235-L. (German.) **Chemical Process of Descaling Stainless and Heat Resisting Steel Without the Use of Acids.** Berthold Wenderott. *Stahl und Eisen,* v. 75, no. 3, Feb. 10, 1955, p. 141-144.

Method consists of treating in salt bath, followed by annealing in reducing atmosphere. Effects of treatment on corrosion and heat resistance. Table, graph, micrographs. 4 ref. (L12, SS)

236-L. (German.) **Several Problems of the Process of Polishing Aluminum and Aluminum Alloys.** F. Baumann. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 1, Jan. 1955, p. 14-18.

Mechanism and controls of anodic and chemical polishing processes, effect of ion concentration in polishing bath, importance of composition of metal to polishing operation. Graphs. 9 ref. (L12, L13, Al)

237-L. (German.) **The Growth of Thin Films.** G. Cario and J. H. Kallweit. *Zeitschrift für Physik,* v. 140, no. 1, 1955, p. 47-56.

Factors which influence the properties of vapor-deposited films. Micrographs, diagram, graphs. 11 ref. (L25, Au)

238-L. (Russian.) **Mechanism of the Influence of Alkaline Metal Ions on the Process of Electrodeposition of Copper.** R. M. Vasenin and S. V. Gorbachev. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 12, Dec. 1954, p. 2156-2169.

Relation of cathode polarization and current density to coefficient of electron polarization of cations. Graphs, table. 22 ref. (L17, Cu, Ni)

239-L. (Spanish.) **New Studies of the Metallizing Processes.** A. Matting. *Ciencia y técnica de la Soldadura,* v. 4, no. 20, Sept.-Oct. 1954, 14 p.

Processes taking place at the tip of wire, formation and acceleration of particles in alloys, the metallized coating. Photographs, drawings, diagrams, graphs, micrographs. 7 ref. (L23)

240-L. **Chemical Nickel Plating Comes to the Fore.** *Chemical Engineering,* v. 62, Mar. 1955, p. 220, 222.

Excellent, even plates formed. Photograph, flowsheet. (L17, Ni)

241-L. **Metallizing for Corrosion Prevention.** A. P. Shepard and R. J. McWaters. *Corrosion,* v. 11, Mar. 1955, p. 115-118; disc., p. 118.

Problems and techniques connected with spraying of molten metal on iron and steel. (L23)

242-L. **Productivity and Cost Control in Metal Finishing. I. Influence of Product Design for Electroplating.** F. C. Ashford. *Electroplating and Metal Finishing,* v. 8, Feb. 1955, p. 50-53.

Design considerations for economical plating and polishing operations. Diagrams, photographs. (L17)

243-L. **Throwing Power of Complex Copper Electrolytes. I. Solutions Containing Ethanolamines.** A. V. Izmaylov and S. V. Gorbachev. *Electroplating and Metal Finishing,* v. 8, Feb. 1955, p. 54-57. (Translated from *Zhurnal Fizicheskoi Khimii,* v. 28, no. 2, Feb. 1954, p. 229-239.)

Previously abstracted from original. See item 528-L, 1954. (L17, Cu)

244-L. **Adhesion and Surface Preparation in Protective Metal Spraying. III. Industrial Grit Blasting Machines.** J. M. Cowan. *Electroplating and Metal Finishing,* v. 8, Feb. 1955, p. 67-72.

Comparison of compressed air and centrifugal equipment. Photographs, diagram. 4 ref. (L10)

245-L. **High-Production Line Deposits Quality Chrome Plate on Bumpers.** Herb Chase. *Iron Age,* v. 175, Mar. 3, 1955, p. 115-118.

Equipment and operation of highly mechanized installation. Photographs. (L17, Cr, Cu, CN)

246-L. Electrolytic Salt Baths Descale Hot and Cold-Rolled Stainless Strip. T. J. Nolan and G. E. Rowan. *Iron Age,* v. 175, Mar. 3, 1955, p. 119-121.

Continuous annealing and pickling at Atlas Steels, Ltd. Photograph, flowsheet. (L12, J23, SS)

247-L. Automatic Control Permits Plating Cell Selection. T. J. Doyle. *Machinery,* v. 61, Mar. 1955, p. 180-187.

Operation of plating machine. Automobile bumpers are automatically shifted between adjacent plating cells and tanks. Table, diagrams, photographs. (L17)

248-L. Hot Dip Galvanizing Is a Science. I. Wallace G. Imhoff. *Wire and Wire Products,* v. 30, Feb. 1955, p. 167-170, 233-235.

Scientific principles of producing high-quality coatings at lowest cost. Photograph, tables, graph. (L16, Zn)

249-L. (Russian.) **Investigation of the Electropolishing Process for Metals.** P. V. Shchigolev and N. D. Tomashov. *Doklady Akademii Nauk SSSR,* v. 100, no. 2, Jan. 11, 1955, p. 327-330.

Current density, polarization curves, anodic passivity phenomenon. Graphs, diagrams. 14 ref. (L13, Cu, Ni, Zn)

250-L. (Pamphlet.) **Electrodeposition of Titanium and Zirconium.** Robert M. Creamer, David H. Chambers and Charles E. White. U. S. Department of Commerce, Office of Technical Services, PB 111525, Dec. 1953, 27 p.

Of aqueous, nonaqueous and fused electrolytes tried, only a fused system of potassium chloride-lithium chloride-titanium(III) chloride gave weighable plates on iron, nickel and copper. Tables. 18 ref. (L17, Ti, Zr, Fe, Ni, Cu)

251-L. (Pamphlet.) **Methods of Vapor Deposited Coatings for Titanium and Titanium Alloys.** Report PB111533. 29 p. 1952. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

Deposition of molybdenum by decomposition of molybdenum hexacarbonyl; hardness of coatings. Tables, charts, photographs, micrographs. (L25, Mo, Ti)

252-L. (Pamphlet.) **Methods of Vapor Deposited Coatings for Titanium and Titanium Alloys.** Report PB111534. 29 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

Wear resistant molybdenum coating; data for bend and wear tests; plating procedures. Tables, charts, micrographs, diagram. (L25, Mo, Ti)

253-L. (Russian.) **Influence of Structure and Composition of Cast Iron on the Quality of Enamel Coating. I.** N. Iukalov. *Liteinoe Proizvodstvo,* 1955, no. 2, Feb., p. 1-5.

Influence of silicon, manganese, sulfur, phosphorus, chromium and nickel content; method of preparation of cast iron for enameling. Tables, micrographs, diagram. 15 ref. (L27, CI)

254-L. (Russian.) **Electrodes for Wear Resistant Deposits of Medium and High Hardness.** I. M. Vagapov. *Svarochnoe Proizvodstvo,* 1955, no. 2, Feb., p. 16-20.

Composition, structure and optimum conditions of operation; physical properties of deposited metal. Tables, graphs, micrographs. (L24, Q9)

255-L. (Russian.) **Influence of Hydropolishing on the Properties of Steel Parts in Operation.** E. A. Satel' and M. A. Elizavetin. *Vestnik Mashinostroeniia,* v. 35, no. 2, Feb. 1955, p. 51-55.

Method, uses and advantages of polishing by a jet of liquid with admixture of fine abrasive. Graphs, diagrams, micrographs. (L10, ST)

256-L. (Russian.) **Electric-Spark Protective Coating as a Method of Increasing Erosion Resistance of Thermohydraulic Power Installations.** A. D. Moiseev. *Vestnik Mashinostroeniia,* v. 35, no. 2, Feb. 1955, p. 55-57.

Types of alloy adaptable for and advantages of such treatment. Table, micrographs. 3 ref. (L general, AY)

257-L. Electroless Nickel Plating Evaluated. Joseph Haas. *American Machinist,* v. 99, Mar. 14, 1955, p. 158-159.

Relative costs; advantages and disadvantages; bath compositions; applications of the process. Diagram. (L14, Ni)

258-L. Metallic Coatings on Non-Metallic Materials. I. Copper Films. *Industrial Finishing (London),* v. 8, Feb. 1955, p. 94, 96, 98-99.

Thermal and chemical deposition of copper films on glass, ceramics and plastics. (L25, Cu)

259-L. Diverse Properties Extend Engineering Uses of Nickel Plating. J. B. Mohler. *Iron Age,* v. 175, Mar. 10, 1955, p. 100-103.

Review of baths, equipment and plating methods. Properties and ap-

plications of nickel and nickel alloy coatings. Photographs, tables, graphs. (L17, Ni)

260-L. Stannous-Fluoride Complexes in a Tin-Nickel Electrolyte. P. A. Brook, A. E. Davies and J. W. Price. *Journal of Applied Chemistry,* v. 5, Feb. 1955, p. 81-84.

Studies to determine mechanism of electrodeposition of alloys. Transport numbers of various ions in a chloride-fluoride tin-nickel electrolyte measured by the Hittorf method. Tables. 10 ref. (L17, Ni, Sn)

261-L. Design Specifications for Chromium Plating Thickness. J. B. Mohler. *Machine Design,* v. 27, Mar. 1955, p. 161-164.

Thickness requirements for various applications. Diagrams, tables. 3 ref. (L17, Cr)

262-L. Periodic Reverse Current Electroplating. Alan Whittaker. *Machinery (London),* v. 86, Feb. 25, 1955, p. 416-420.

Process, based on reversal of polarity of plated piece, permits bright, surface leveling deposits to be produced at high speeds. Table. (L17, Cu, Ag, Zn, Cd, Au)

263-L. Chromium Diffusion Combats Corrosion, Heat, and Wear. Jack Hollingum. *Machinist (London),* v. 99, Mar 4, 1955, p. 361-367.

Coating methods; properties of coatings; applications. Photographs, micrographs, graphs. (L15, CN, AY, Cr)

264-L. Inhibited Acids in Plating Cycles. J. W. Carroll. *Metal Finishing,* v. 53, Mar. 1953, p. 60-63.

Advantages of inhibitors in baths on adhesion and appearance of deposit. Tables. 3 ref. (L17, Ni, ST)

265-L. Electroplating for Shelf Life. J. B. Mohler. *Metal Finishing,* v. 53, Mar. 1955, p. 64-67, 72.

Types of coatings recommended for manufactured products depending on costs, thickness, appearance, environment and life. Graphs, tables, photographs. 1 ref. (L17, ST, Zn, Cd, Sn, Ni, Cr, Cu, Pb)

266-L. Continuous Pickling Stainless Steel. Francis F. Jaray. *Metal Finishing,* v. 53, Mar. 1955, p. 68-72.

Operating procedure of a unique British pickling plant. Photographs. (L12, SS)

267-L. Surface Treatment and Finishing of Light Metals. V. Chemical Conversion Coatings. S. Wernick and R. Pinner. *Metal Finishing,* v. 53, Mar. 1955, p. 73-77.

Chemical oxidation of tubes; chromate and phosphate processes; comparison of chemical oxide conversion coatings. Tables. 124 ref. (L14, Al)

268-L. Electroplating Equipment. Robert Allen. *Metal Industry,* v. 86, Feb. 25, 1955, p. 147-150.

Layout; installation; maintenance. Photographs. (L17)

269-L. Plating Jigs. J. John Preston. *Metal Industry,* v. 86, Mar. 11, 1955, p. 189-191.

Material; insulation; design; application. Diagrams, tables. (L17)

270-L. Epoxy Coatings for Metal Decorating Finishes. M. A. Glaser, E. J. Bromstead and G. L. Weaver. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 27, Jan. 1955, p. 3-9.

Characteristics and applications. Tables, photograph. (L26)

271-L. Evaluation of Etch Primers in Metal Coating Systems. *Products Finishing,* v. 19, Mar. 1955, p. 42 + 6 pages.

Surface preparation and conditions for effective use of pretreatment primers. Tables. (L26, Al, CN, Fe, Zn, Cd, SS, Ag, Au)

272-L. Hot Dip Galvanizing Is a Science. II. Wallace G. Imhoff. *Wire and Wire Products,* v. 30, Mar. 1955, p. 295-297.

Effect of base-metal thickness and immersion time on coating thickness. Graphs, tables. (L16, Zn)

273-L. Calculation of Modern Continuous Pickling Plants. W. Fackert. *Henry Brutcher Translation No.* 3431, 29 p. (Slightly abridged from *Stahl und Eisen,* v. 72, no. 20, 1952, p. 1196-1207.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 958-L, 1952. (L12, ST)

274-L. Acid Pickling—A Closed-Cycle Process? W. Fackert. *Henry Brutcher Translation No.* 3432, 15 p. (Slightly abridged from *Stahl und Eisen,* v. 74, no. 14, 1954, p. 888-894.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 684-L, 1954. (L12)

275-L. Electrodeposition of Chromium. A. T. Vagramyan and D. N. Usachev. *Henry Brutcher Translation No.* 3441, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 98, no. 4, 1954, p. 605-607.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 45-L, 1955. (L17, Cr)

276-L. (French.) **Study of the Overvoltage of Cadmium in Solutions of**

Cadmium Sulfate. Anne-Marie Baticle. *Comptes rendus,* v. 240, no. 7, Feb. 14, 1955, p. 763-765.

Overvoltage curves plotted for cadmium cathodes in solutions of cadmium sulfate and in presence of excess of sulfuric acid. Graph. (L17, Cd)

277-L. (French.) **Surface Preparation of Ferrous Metals.** J. Liger. *Métallurgie et la construction mécanique,* v. 87, no. 2, Feb. 1955, p. 119, 121-122.

Sand-blasting and shot-peening; surface properties after treatment. (L10)

278-L. (French.) **Pickling Inhibitors and Accelerators.** G. Rossi-Landi. *Métallurgie et la construction mécanique,* v. 87, no. 2, Feb. 1955, p. 125, 127.

Role of inhibitors and accelerators in chemical cleaning of steel. (L12, ST)

279-L. (French.) **Bulk Anodic Oxidation and Coloring of Small Light Alloy Pieces.** Charles Etienne. *Revue de l'aluminium,* v. 32, no. 217, Jan. 1955, p. 71-79.

Treating of small parts in baskets reduces cost of operation. Diagrams, photographs. (L19, Al)

280-L. (French and German.) **Copper Anodes for Galvanic Baths.** H. Bovert. *Pro-Metal,* v. 7, no. 43, Feb. 1955, p. 452-456.

Compositions and properties of copper anodes and baths for various plating conditions. Photograph. 6 ref. (L17, Cu)

281-L. (German.) **The Current State of Phosphatizing Iron and Non-Ferrous Metals.** Willi Machu. *Werkstoffe und Korrosion,* v. 6, no. 2, Feb. 1955, p. 72-79; disc., p. 79-80.

Value of phosphate coatings to prevent corrosion, reduce friction and as a paint base. Photographs. 27 ref. (L14)

282-L. (German.) **Chemical Polishing of Brass and German Silver. III. Chemistry of the Polishing Process.** Gerhard Schmid and Heinz Spähn. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 128-137.

Dependence of the dissolution rate and the formation of nitrous acid upon the water content; composition of gases formed during polishing; activity measurements; theory of chemical polishing. Graphs, diagram. 14 ref. (L12, Cu, Zn, Ni)

283-L. **Electrochemical Behavior of a Titanium-Fused Salt-Platinum Cell.** M. E. Straumanis and A. W. Schlechten. *Electrochemical Society, Journal,* v. 102, Mar. 1955, p. 131-136.

Studies of the action of air and moisture during titanium electrolysis. Diagrams, tables, graph. 7 ref. (L17, Ti)

284-L. **Aluminum Coating Process Developed for Iron and Steel Wire.** Bernard S. Westerman. *Iron and Steel Engineer,* v. 32, Mar. 1955, p. 126, 129-130.

Equipment and operating procedures. Diagram, photograph. (L15, Al, Fe, ST)

285-L. (Book.) **Chromium Electroplating.** 159 p. PB 111514. Office of Technical Services, U. S. Department of Commerce, Washington, D. C. $5.00.

Investigates the fundamental principles of chromium deposition and evaluates conditions existing in plating baths from the standpoint of thermodynamic and reaction rate theory. (L17, Cr)

286-L. (Book.) **Flow-Coating.** E. A. Zahn. 295 p. 1954. Research Press, Dayton, Ohio. $6.50.

A detailed account of specific problems, flow-coater, design, finishing methods, and selection of paints and solvents for industrial finishing processes. (L26)

287-L. (Book.) **The Measurement and Control of Industrial Paint Finishing Costs.** 60 p. 1955. Imperial Chemical Industries Ltd., London S. W. 1, England.

Three papers on ways of reducing painting costs. (L26)

288-L. **A New Technique for Simultaneous Recording of Strains and Temperature in Enamel-Metal Systems.** J. H. Lauchner, R. L. Cook and A. I. Andrews. *American Ceramic Society Bulletin,* v. 34, Apr. 1955, p. 105-108.

Photo-electric cell incorporated as means of measuring strains. Photographs, diagrams, graphs. 5 ref. (L27, Q25)

289-L. **The Determination of Boric Acid in Nickel Plating and Acid Zinc Plating Baths by Means of Cation Exchangers.** Gunnar Gabrielson. *American Electroplaters' Society Proceedings,* v. 41, 1954, p. 23-26.

Removing nickel ions by percolating the solution through a layer of a hydrogen saturated cation exchanger. Tables. 5 ref. (L17, Ni, Zn)

290-L. **Precision Barrel Finishing.** Malcolm M. Maynes. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 27-32.

Method of deburring and surface finishing metal parts. Photographs. (L10)

291-L. **Radiometric Study of Supplementary Chromate Coatings for Zinc**

and Cadmium Plating. Stanley L. Eisler, Jodie Doss and Mary Ann Henderson. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 33-40.

Radiosulfur and radiochromium used to determine amounts of sulfate and chromium contained in coatings produced from various supplementary dip solutions. Tables. 5 ref. (L14, Zn, Cd)

292-L. Bicycle Horns Coated by Vacuum Metallizing. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 46-49.

Horns finished by depositing thin layer of aluminum under vacuum in the metallizer. Photographs. (L25, Al)

293-L. The Polarographic Analysis of Nickel Plating Solutions. J. V. Petrocelli and G. Tatoian. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 50-56.

General principles and techniques. Circuit diagram, graphs, photograph, tables. 9 ref. (L17, S11, Ni)

294-L. The Use of Unplasticized Polyvinyl Chloride in Electroplating Plants. Laurence N. Thomas. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 57-62.

Uses and applications suggested to users of chemical processing and allied equipment. Photographs, tables. (L26, L17)

295-L. Current Density Distribution in Electroplating by Use of Models. Gilbert Ford Kinney and John V. Festa. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 66-70.

Methods by which the current distribution can be controlled. Diagrams, graphs. 2 ref. (L17)

296-L. Tentative Recommended Practice for Preparation of Copper and Copper-Base Alloys for Electroplating. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 71-75.

A guide for platers in setting up suitable cleaning and conditioning cycle preparatory to electroplating. 1 ref. (L17, Cu)

297-L. Metal Reflector Finishing. E. B. Heyer. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 76-78.

Finishing operations performed on metal reflectors. Photographs. (L general, Ni, Al, Rh)

298-L. Nickel Plating Troubles and Cures. O. A. Stocker, A. Korbelak and S. A. Carrano. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 83-88.

Chart covering nickel plating trouble shooting. (L17, Ni)

299-L. Radiometric Study of the Chromium-Sulfate Complex Formed in Chromium Plating Baths. Ronald L. Sass and Stanley L. Eisler. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 89-93.

Determination of ionic nature of coordination complex formed and amount of sulfate so complexed. Tables. 11 ref. (L17, Cr)

300-L. Voltage and Current Fluctuations in the Output of Plating Rectifiers. V. L. Richards. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 107-115.

Data on voltage and current fluctuations in the output of selenium plating rectifiers. Graphs, tables. (L17, Se)

301-L. The American Electroplaters' Society Research Program. Earl J. Serfass. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 185-187.

Review of active and inactive projects and the results of activities. Tables. (L general, A9)

302-L. Copper-Tin Alloy Plating. W. H. Safranek and C. L. Faust. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 201-208; disc., p. 208.

Copper-tin alloy plates in composition range of 17 to about 50% tin, the balance copper, exhibited good leveling properties and good protection against corrosion. Bronze plus chromium plates greatly superior to copper plus chromium. Because of good performance, bronze alloy is being considered seriously as a replacement for nickel plate. Tables, micrographs, photographs. 12 ref. (L17, Cu, Sn)

303-L. A Large-Scale Electroless Nickel Custom Plating Shop. G. Gutzeit and R. W. Landon. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 256-260; disc., p. 260-261.

Commercial application of electroless nickel coatings. Flowsheets, photographs. 3 ref. (L14, Ni)

304-L. The Anodic Treatment of Aluminum in Sulfuric Acid Solutions. Roy C. Spooner. *Electrochemical Society, Journal,* v. 102, Apr. 1955, p. 156-162.

Effect of process variables on coating properties. Graphs, table. 10 ref. (L19, Al)

305-L. Relation of Color to Certain Characteristics of Anodic Tantalum Films. A. F. Torrisi. *Electrochemical Society, Journal,* v. 102, Apr. 1955, p. 176-180.

Color of anodic film defines volt-

age and temperature conditions of formation, which, in turn, determine properties of the coating. Tables, graphs. 7 ref. (L19, Ta)

306-L. The Electroforming of Components and Instruments for Millimetre Wavelengths. A. F. Harvey. *Institution of Electrical Engineers, Proceedings,* v. 102, pt. B, no. 2, Mar. 1955, p. 223-230.

Development of improved methods and processes. Table, photographs, diagrams. 24 ref. (L18)

307-L. Instrumentation: Controlled Measurement Lowers Pickling Costs. D. H. Krouse. *Iron Age,* v. 175, Apr. 7, 1955, p. 132-134.

Measurement and control of fresh acid addition to pickling processes through use of modern instrumentation. Diagrams. (L12)

308-L. A Method for the Preparation of Thin Films of Plutonium and Uranium. K. M. Glover and P. Borrell. *Journal of Nuclear Energy,* v. 1, Feb. 1955, p. 214-217.

Directions for making up solutions for painting foils and coating the fission counters by a dipping process. Diagram. 2 ref. (L16, Pu, U)

309-L. Electroplating on Magnesium. H. K. DeLong. *Metal Progress,* v. 67, Apr. 1955, p. 102-108.

Success of electroplating magnesium is dependent almost entirely on using a preplate of zinc and on adhesion and uniformity of initial coating. Subsequent coatings can be applied according to standard plating practice. Photographs, graphs, table. (L17, Mg)

310-L. Yellow Brass Plating. E. J. Roehl, E. Michel and L. R. Westbrook. *Plating,* v. 42, Apr. 1955, p. 403-405.

Process by which high electrode efficiencies can be obtained at high current densities. Table, graphs. (L17, Cu)

311-L. The Measurement of Current Distribution in an Acid Copper Plating Solution. E. J. Wilhelm and Richard F. Kayser. *Plating,* v. 42, Apr. 1955, p. 406-412.

Method of measuring current distribution on cathode with aid of small probe electrode. Tables, diagrams, graphs. 5 ref. (L17, Cu)

312-L. Notes on Experiments in Electrodeposition With Perfluorinated Acids. John K. Taylor and Abner Brenner. *Plating,* v. 42, Apr. 1955, p. 413-414.

Value of perfluorinated acids in forming plating baths. Tables. (L17, Cr, Ni, Co)

313-L. The Influence of the Physical Metallurgy and Mechanical Processing of the Basis Metal on Electroplating. II. Correlated Abstracts. A. E. R. Westman and F. A. Mohrnheim. *Plating,* v. 42, Apr. 1955, p. 417-421.

Covers nature, surface, microgeometry, crystal orientation, polish, stresses and corrosion of the basis metal. 198 ref. (L17)

314-L. Cleaning and Preparation of Steel Prior to Finishing. *Stove and Appliance Builder,* v. 20, Apr. 1955, p. 72-77.

To obtain full benefit from finishing materials, correct pretreatment of steel surfaces is essential. Tables. (L10, L12, ST)

315-L. Practical Hard Facing With Fused Self-Fluxing Metallized Coatings. Harvey S. Miller. *Welding Journal,* v. 34, Mar. 1955, p. 214-219.

"Spraywelding" technique involves four different stages; preparation of surface, spraying of deposit, fusing of deposit and finishing. Photographs. (L24, Cn, SS, Ni, Cr, B)

316-L. Pack Chromizing of Steel in a Compound Containing Chromium Sesquioxide. G. N. Dubinin. *Henry Brutcher Translation No.* 3466, 7 p. (From *Vestnik Mashinostroeniya,* v. 34, no. 11, 1954, p. 56-58.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 156-L, 1955. (L15, Cr, ST)

317-L. (German.) **Protection of Aluminum From Corrosion by Natural or Augmented Oxide Films: Recent Research.** D. Altenpohl. *Metall,* v. 9, nos. 5-6, Mar. 1955, p. 164-171.

Effectiveness of natural and artificial films; relation between oxide film and aluminum potential. Tables, diagrams, graphs. 33 ref. (L14, Al)

318-L. (German.) **Cyanide Copper Baths, Especially High-Speed Baths.** Heinz W. Dettner. *Metalloberfläche,* Ausgabe B, v. 7, no. 3, Mar. 1955, p. 33-35.

Compositions of and results from different copper-plating baths. Tables. 15 ref. (L17, Cu)

319-L. (Russian.) **Joint Release of Copper and Hydrogen During the Electrolysis of Complex Solutions.** E. A. Ukshe and A. I. Levin. *Doklady Akademii Nauk SSSR,* v. 100, no. 5, Feb. 11, 1955, p. 943-946.

Mathematical treatment of the discharge theory. Graphs. 9 ref. (L17, Cu)

320-L. (Russian.) **Experiment in the**

Use of "Asbovinyl" as a Corrosion-Resistant Material. A. I. Rychkov and I. Ia. Klinov. *Khimicheskaia Promyshlennost',* 1954, no. 8, Dec., p. 492-493.

Protective coating identified as ethynol lac and ground asbestos for tanks and machine parts in sulfite cellulose plants, etc. Table. (L26)

321-L. (Russian.) **Thermal-Diffusion Sulfiding of Steels.** V. V. Gal'chenko. *Stanki i Instrument,* v. 26, no. 2, Feb. 1955, p. 17-19.

Sulfur diffusion coatings for steel rollers. Coating methods. Tables. 3 ref. (L15, ST)

322-L. **The Use of Filters in Electroplating.** J. B. Mohler and Charles E. Crowley. *Electrotypers and Stereotypers Magazine,* v. 41, Apr. 1955, p. 5 + 5 pages.

Sources of contamination, rough deposits, filtering methods and filtering rates. Diagrams, table. (L17)

323-L. **Tin Fluoborate Plating.** J. B. Mohler. *Metal Finishing,* v. 53, Apr. 1955, p. 59-61.

Addition agents; baths; operating procedures. Graphs, photograph. 10 ref. (L17, Sn)

324-L. **Coatings and Coating Methods for Aluminum Foil.** I. O. Robertson, Jr. *Paper, Film and Foil Converter,* v. 29, May 1955, p. 25-29.

Purposes, applications and coating techniques. Photograph, diagrams. (L general, Al)

325-L. **Surface Treatment and Finishing of Light Metals.** X. S. Wernick and R. Pinner. *Sheet Metal Industries,* v. 32, no. 336, Apr. 1955, p. 273-283.

Electrodeposition on aluminum, tests for electroplated aluminum; immersion coatings. Review of the corrosion resistance of various coatings. Photographs, graphs, micrographs, diagrams, tables. 57 ref. (To be continued.) (L17, L16, R general, Cu, Zn, Cd, Ag, Cr, Ni, Al)

326-L. **Porcelain Enamels for Aluminum.** James I. Mueller. *Trend in Engineering, (University of Washington),* v. 7, Apr. 1955, p. 21-24.

Satisfactory enamel may be obtained from either a highly fluoro or borosilicate glass, or from a phosphate glass; results indicate development possibilities of good lead-free coatings. Photographs, tables. 16 ref. (L27, Al)

327-L. **New Aluminizing Process for Steel Wire.** Bernard S. Westerman. *Wire and Wire Products,* v. 30, Apr. 1955, p. 419-421, 483-485.

Process which is practicable from production standpoint as well as economical in cost. Photographs, diagram. (L15, Al)

328-L. (English.) **Cathode Film Studies by the Drainage Method.** A. Brenner and G. Wranglén. *Svensk Kemisk Tidskrift,* v. 67, no. 2, 1955, p. 81-85.

In measuring the pH of the cathode film in nickel deposition by the "drainage method", results obtained were found to be highly dependent on drainage time. Graphs. 4 ref. (L17, Ni)

329-L. (Czech.) **Diffusion Chromizing of Steel.** E. Gasior. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, no. 1, 1955, p. 1-10.

Development of steel protection by chromium diffusion. Theoretical aspects of chromizing process and principal properties of protective coatings obtained. Graphs, tables. 32 ref. (L15)

330-L. (Czech.) **Inmet Oil as a Lubricant for Hot Tin-Plating of Iron Sheets.** J. Foryst, J. Madejski and I. Zarzycki. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, no. 1, 1955, p. 11-16.

Laboratory and industrial tests on a substitute lubricant for hot tinplating of iron sheets. Tables, graphs, micrographs, diagram. 4 ref. (L17, Sn)

331-L. (German.) **Influencing the Silicon Impregnation of Steel by Different Alloying Elements.** Erich Fitzer. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 159-169.

Protection of steel against scaling and corrosion by surface diffusion of different metals and by surface reactions with vapor mixtures of the subchlorides of silicon, aluminum and titanium protection of chromium steels against vanadium pentoxide corrosion. Micrographs, tables, graphs. 24 ref. (L15, ST)

332-L. (German.) **Metal Coating of Glass, Porcelain and Other Ceramic Products in High Vacuum.** H. Kalpers. *Sprechsaal,* v. 88, no. 6, Mar. 1955, p. 112-113.

Equipment and operation. Table, photographs. (L25)

333-L. (Italian.) **Hard Coating of Pure and Alloyed Aluminum.** F. Sacchi. *Alluminio,* v. 24, no. 1, Jan. 1955, p. 5-15.

Discussed in view of the mechanical exploitation of the resulting surface properties. Tables, photographs, micrographs. 9 ref. (L24, Al)

334-L. (Russian.) **Investigation of Cathode Processes in Chromium Electroplating.** A. I. Levin and A. I. Falicheva. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 1, Jan. 1955, p. 95-104.

Influence of chromium trioxide concentration on polarization of platinum chromium cathodes. Graphs. 17 ref. (L17, Cr, Pt)

335-L. (Russian.) **Cathode Polarization During Galvanic Tinplating, From Chloride Electrolytes.** I. E. Gurevich. *Zhurnal Prikladnoi Khimii,* v. 28, no. 3, Mar. 1955, p. 285-290.

Effects resulting from gelatin, alpha-naphthol, cresol or other additions on cathode polarization in relation to current density. Graphs, tables. 7 ref. (L17, Sn)

336-L. Comparative Cleaning by Diphase Cleaners and Alkaline Salts. Lloyd Osipow, Herbert Pine, Cornelia T. Snell and Foster Dee Snell. *Industrial and Engineering Chemistry,* v. 47, Apr. 1955, p. 845-847.

Diphase cleaners were superior; alkaline salts improved with higher temperatures on synthetically soiled steel panels. Tables, graphs. 3 ref. (L12, ST)

337-L. Coating Pipelines in Place Internally With Plastics. J. C. Watts. *Corrosion,* v. 11, May 1955, p. 210-216.

Cleaning processes, methods of application, materials used and results obtained. Graphs, photographs, diagram, tables. (L27)

338-L. Electric Equipment for Aluminum Anodizing. D. C. Griffith. *Electrical Engineering,* v. 74, May 1955, p. 384-387.

Equipment and advantages described, together with background information on the processes themselves. Photographs, diagrams, graph. 11 ref. (L19)

339-L. The Crystallization of Anodic Tantalum Oxide Films in the Presence of a Strong Electric Field. D. A. Vermilyea. *Electrochemical Society, Journal,* v. 102, May 1955, p. 207-214.

Nature of the crystals and the mechanism of their growth. Graphs, micrographs, tables. 3 ref. (L19, Ta)

340-L. Stress During the Electrodeposition of Copper on Copper Substrate. Hussein Sadek, M. Halfawy and S. G. Abdu. *Electrochemical Society, Journal,* v. 102, May 1955, p. 226-228.

Effect of current density, time and coating composition and thickness on deflection of copper strips. Graphs. 14 ref. (L17, Cu)

341-L. Electroplating in Western Germany. I. Robert Pinner. *Electroplating and Metal Finishing,* v. 8, Apr. 1955, p. 131-135.

Organization, trade position and structure of the plating industry. Map, photographs. 2 ref. (To be continued) (L17)

342-L. Automation in the Plating Industry. II. Productivity and Cost Control in Metal Finishing. H. Silman. *Electroplating and Metal Finishing,* v. 8, Apr. 1955, p. 136-139.

Discussion of 'through-type' plating machines with special reference to the Duplex Carriage, and 'Vertical Lift Return-Type' plants. Photographs, diagram. (To be continued) (L17, A5)

343-L. An Experimental Investigation of the Metal Spraying Process. A. Matting and K. Becker. *Electroplating and Metal Finishing,* v. 8, Apr. 1955, p. 143-145.

Mechanisms of the metal spraying process and results obtained in investigations of the processes taking place at the wire end. Diagrams, photographs. (L23)

344-L. Progress in Barrel Finishing. I. The Development and Technique of Barrel Finishing. C. J. A. Kellard. *Electroplating and Metal Finishing,* v. 8, Apr. 1955, p. 149-152.

Modern progress with barrel finishing media and compounds and a summary of the effects of operating variables on the process. 4 ref. (L10)

345-L. The Protective Function of Paint Coatings on Metals. P. J. Gay. *Electroplating and Metal Finishing,* v. 8, Apr. 1955, p. 153-156.

Some of the properties of surface treatments and of paint coatings, with reference to electrochemical corrosion processes. 7 ref. (L26)

346-L. The Surface Areas of Evaporated Metal Films. B. M. W. Trapnell. *Faraday Society, Transactions,* v. 51, Mar. 1955, p. 368-370.

Measures area per unit weight of nickel, iron, rhodium, molybdenum, tantalum and tungsten evaporated films. Table, graph. 8 ref. (L25, Ni, Fe, Rh, Mo, Ta, W)

347-L. Development, Evaluation of an Orange Enamel of Improved Light Fastness. William A. Gottfried. *Finish,* v. 12, May 1955, p. 50-51.

Investigation undertaken to develop light, stable international orange-colored coatings for use on metals, and also to develop a suitable rapid method for measuring color change. Tables. (L27)

348-L. Abrasives, Their Use in Surface Preparation. P. C. Bardin. *Industrial Finishing,* v. 31, Apr. 1955, p. 44 + 4 pages.

Abrasive application methods, types and grades. Photographs. (L10)

349-L. Mass Production Methods Spur Industrial Use of Refractory Ceramic Coatings. F. D. Shaw. *Iron Age,* v. 175, Apr. 21, 1955, p. 97-99.

Modern coatings allow substitution of lighter gage metals, sometimes permit mild steels to replace higher alloy grades. Photographs. (L27, CN)

350-L. Proper Handling Devices Aid Batch Pickling. W. A. Risher. *Iron Age,* v. 175, May 12, 1955, p. 95-97.

Design of sling chains, hooks and fabricated carriers used in batch-type pickling operations. Photographs. (L12)

351-L. Potential at Zero Charge for Reversible and Ideal Polarized Electrodes. Paul Rüetschi and Paul Delahay. *Journal of Chemical Physics,* v.23, Apr. 1955, p. 697-699.

Accounts for differences between experimental potentials at zero charge as obtained with reversible and ideal polarized electrodes. Graph, diagram. 30 ref. (L17)

352-L. Butyl Titanate Heat and Corrosion Resistant Paints. A. B. Cox and G. Winter. *Paint Manufacture,* v. 25, Apr. 1955, p. 146-150.

New developments, formulations and applications on land, sea, and air. Table, photograph. 4 ref. (L26)

353-L. Coating *Will* Protect Cooling Tower Headers. R. L. Elkins and G. O. Hult. *Pipe Line Industry,* v. 2, May 1955, p. 54-57.

Protective coatings, if applied properly and in sufficient film thicknesses, will control corrosion of piping headers to cooling towers. Photographs, table. (L26)

354-L. Porosity of Nickel Deposits By Autoradiographic Techniques. Russell H. Wolff, Mary Ann Henderson and Stanley L. Eisler. *Plating,* v. 42, May 1955, p. 537-544.

Determination of porosity by plating the nickel over an electrodeposit containing radio-active iron. Photographs, table, autoradiographs. 11 ref. (L17, S15, Fe, Ni)

355-L. Zinc and Cadmium Plating. W. H. Millward. *Plating,* v. 42, May 1955, p. 545-549.

Baths, equipment and procedures for automatic and still-vat cadmium and still-vat zinc plating. (L17, Cd, Zn)

356-L. Polarographic Determination of Copper in Cyanide. J. V. Petrocelli and G. Tatoian. *Plating,* v. 42, May 1955, p. 550-552.

Procedure and data for rapid determination of copper in cyanide and acid copper plating baths. Tables, graphs. 3 ref. (L17, S11, Cu)

357-L. Surface Treatment of Metals With Peroxygen Compounds. Paul H. Margulies. *Plating,* v. 42, May 1955, p. 561-566.

Equipment, baths and procedures for various dip finishes for cadmium, silver, steel, aluminum and other metals. Photographs, micrographs. (L16, Al, Cd, Ag, ST)

358-L. Applying Direct Chromium Plate on Zinc. *Precision Metal Molding,* v. 13, May 1955, p. 53-54.

Operations necessary to produce a finished part ready for assembly. Photographs. (L17, Cr, Zn)

359-L. Bright-Dip Line for Aluminum or Brass. *Steel,* v. 136, May 2, 1955, p. 108-109.

Automatic line can adjust its sequence for brass or aluminum. Diagram, photographs. (L16, Al, Cu)

360-L. Aluminum Castings Get a Glassy Coat. *Steel,* v. 136, Apr. 25, 1955, p. 114, 116.

Enamel can be drilled or sawed without chipping; bare aluminum areas can be welded without disturbing the adjacent coating. Photographs. (L27, Al)

361-L. Felt in Metal Finishing. L. D. Gruberg. *Steel Processing,* v. 41, Apr. 1955, p. 237-240.

Precision finishing, grinding, polishing and buffing operations in the metals industries. Photographs. (L10)

362-L. Tin Plating With Potassium Salts. Frederick A. Lowenheim. *Tin and Its Uses,* 1955, no. 31, p. 7-10.

Inventor expresses his views on advantages of potassium stannate tin-plating bath process. Graphs, table. 9 ref. (L17, Sn)

363-L. Automatic Hard Facing With Mild Steel Electrodes and Agglomerated Alloy Fluxes. J. S. McKeighan. *Welding Journal,* v. 34, Apr. 1955, p. 301-308.

Mechanics of process, equipment required and its operation, economies of the process, and a few general procedure suggestions. Photographs, diagram, table. (L24, ST)

364-L. Fused-in-Place Spray Metallized Coatings. Sam Tour. *Welding Journal,* v. 34, Apr. 1955, p. 329-336

Methods of metallizing and fusing, metallurgical nature and service applications for several spray metallized coatings. Photograph, diagram, micrographs, table. (L23)

365-L. Influence of Anode Shape on

Uniformity of Deposits in Nickel Plating. D. Mojert. *Henry Brutcher Translation No.* 2863, 5 p. (From *Metall,* v. 5, nos. 17-18, 1951, p. 388-392.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 803-L, 1951. (L17, Ni)

366-L. Metallizing With Copper Carbonyl. E. Crivelli. *Henry Brutcher Translation No.* 2902, 9 p. (From *La Chimica,* v. 17, no. 4, 1941, p. 185-186.) Henry Brutcher, Altadena, Calif.

Use of copper carbonyl for the coating of various organic objects with copper. (L14, Cu)

367-L. Effect of Ripple in Rectified Alternating Current Upon the Formation of Electrodeposits. M. E. Beckmann and F. Maass-Graefe. *Henry Brutcher Translation No.* 3025, 19 p. (From *Mettalloberfläche,* v. 5, no. 11, 1951, p. A161-A169.)

Previously abstracted from original. See item 153-L, 1952. (L17, Sn, Cu, Ni, Cr)

368-L. Large-Sized Rolls Built up by Chromium Plating. M. E. Gol'dshtein. *Henry Brutcher Translation No.* 3480, 5 p. (Slightly condensed from *Stanki i Instrument,* v. 25, no. 5, 1954, p. 33-34.) Henry Brutcher, Altadena, Calif.

Technique for plating portions of rolls without a large rig or having to immerse the entire roll in a chromium plating bath, with resulting economies in equipment and electrolyte. Diagrams. (L17, T5, Cr)

369-L. (Russian.) **Influence of the Curvature of the Microprofile of a Surface on the Electrochemical Polishing of Metals.** S. I. Krichmar. *Doklady Akademii Nauk SSSR,* v. 101, no. 2, Mar. 11, 1955, p. 297-300.

Mathematical treatment; calculation of polishing time. Table, graph. 4 ref. (L13)

370-L. (Book.) **American Electroplaters' Society, Proceedings,** (Annual Volume), v. 41, 1954. 288 p. American Electroplaters' Society, 445 Broad, St., Newark 2, N. J.

Forty-five reports delivered at annual convention. Papers individually abstracted. (L17)

371-L. Cystine as an Addition Agent in the Electrodeposition of Copper. A. J. Sukava and C. A. Winkler. *Canadian Journal of Chemistry,* v. 33, May 1955, p. 961-970.

Cystine gave polarization-time curves similar to those of gelatine. Graphs. 13 ref. (L17, Cu)

372-L. Stop Corrosion From Sulfur Compounds, Hydrochloric Acid. H. E. Smith and Gordon Weyermuller. *Chemical Processing,* v. 18, May 1955, p. 22-24.

How 410 stainless cladding solved problems at Humble Oil & Refining Co. pipe still. Photograph. (L22, SS)

373-L. Guards Against Corrosive Iodine Fumes. Edgar B. Witmer and Roy Helsing. *Chemical Processing,* v. 18, May 1955, p. 76-77.

Controlled with a chlorinated rubber-base enamel. Photograph. (L26)

374-L. Electroplating on Aluminum. R. F. Hafer. *Metal Progress,* v. 67, May 1955, p. 93-97.

Careful surface preparation is needed to obtain sound and adherent electrodeposits. Photographs, table. (L17, Al)

375-L. Tin Plating of Copper Wire. C. Fred Gurnham. *Products Finishing,* v. 19, May 1955, p. 56 + 5 pages.

Stannous fluoborate plating has many advantages over hot-dip process. Photograph. (L16, Cu, Sn)

376-L. (Dutch.) **Currentless Nickel Plating.** A. Liket. *Bedrijf en Techniek,* v. 10, no. 225, Apr. 9, 1955, p. 162-164.

Principle; composition and control of nickel-plating bath; properties of nickel deposits. Diagrams, table. 24 ref. (L14, Ni)

377-L. (German.) **Adherence of Iron-Saturated Zinc Melt to Manganese-Containing Iron.** Hans-Joachim Wiester and Dietrich Horstmann. *Archiv für das Eisenhüttenwesen,* v. 26, no. 4, Apr. 1955, p. 199-204.

Influence of temperature and time on adherence of zinc to iron containing up to 9.3% manganese. Tables, graphs, micrographs. 4 ref. (L16, Zn)

378-L. (German.) **Mechanism of Corrosion of Plain and Painted Iron Objects.** A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 4, Apr. 1955, p. 121-133.

Corrosive action of water and atmosphere; paint as a protective agent and its effectiveness on corroded surfaces; corrosion mechanism under paint. Tables, drawings, diagrams. 62 ref. (L26, R4, R3, Fe)

379-L. (Norwegian.) **Nickel Plating.** Frithjof Dyngvold. *Teknisk Ukeblad,* v. 102, no. 15, Apr. 14, 1955, p. 303-307.

Development and principles of electrolytic and chemical nickel plating; bath compositions; mechanical properties of the deposits. 7 ref. (L17, L14, Q general, Ni)

380-L. Paint Faults and Remedies.

X. H. Courtney Bryson. *Corrosion Prevention and Control,* v. 2, May 1955, p. 29-32.

Causes of discoloration and their control. Photograph. (To be continued.) (L26)

381-L. Rubber and Allied Substances as Anti-Corrosive Materials. B. J. Wilson. *Corrosion Technology,* v. 2, Apr. 1955, p. 107-112.

Natural rubber; synthetic rubber; and rubber-like plastics including PVC, polyethylene, Saran, Teflon and Kel-F. Photographs, table. 11 ref. (L26)

382-L. The Coating of Magnesium Alloys. W. E. Allsebrook. *Corrosion Technology,* v. 2, Apr. 1955, p. 113-116.

Methods of treatment and painting used to preserve magnesium alloys, extensively used in castings where lightness is essential. Photographs. 9 ref. (L26, Mg)

383-L. Economy in Manual Spray Gun Operation. J. Muirhead. *Electroplating and Metal Finishing,* v. 8, May 1955, p. 172-176.

Factors which influence cost and quality in manual spray painting include correct choice of spraying equipment and materials, training of spraying operator and proper supervision and process control. Photographs. (L26)

384-L. Metal Spraying for Protection of Iron and Steel. *Electroplating and Metal Finishing,* v. 8, May 1955, p. 177-180.

Summary of new British and U. S. specifications for spraying for atmospheric and high-temperature protection. Tables. 4 ref. (L23, S22, ST)

385-L. The Protection of Iron and Steel by Sprayed Coatings of Aluminium or Zinc. F. A. Champion. *Electroplating and Metal Finishing,* v. 8, May 1955, p. 180-182, 189.

Effects of coating weight and thickness on life of steel exposed to atmospheric corrosion. Graphs, table. 12 ref. (L23, R3, Al, Zn)

386-L. Automation in the Plating Industry. H. Silman. *Electroplating and Metal Finishing,* v. 8, May 1955, p. 184-189.

Principles of mechanization in electroplating; compares through-type and return-type machines; instrumentation and automatic control systems. Photographs, diagrams. 12 ref. (L17)

387-L. Electroplating of Precious Metals. S. W. Baier. *Industrial Finishing (London),* v. 8, Apr. 1955, p. 203-209.

Processes in use today for electroplating silver, gold, rhodium, palladium and platinum and recent modifications. Tables, photographs. 16 ref. (L17, Ag, Au, Rh, Pd, Pt)

388-L. Metallic Coatings on Non-Metallic Surfaces. II. Lead Sulphide Films. III. Nickel Films. *Industrial Finishing (London),* v. 8, Apr. 1955, p. 214, 216-218.

Formulations, properties and applications. (L general, Ni)

389-L. Modern Porcelain Enameling System for Stove Parts Utilizes Gas Furnaces and Ovens. *Industrial Heating,* v. 22, Apr. 1955, p. 799 + 6 pages.

Surface preparation; ground and cover coats; laboratory control. Photographs. (L27)

390-L. Russian Work on Sulphided Steels. W. G. Cass. *Iron & Steel,* v. 28, May 1955, p. 204, 263, 288.

Results of tests reported in Soviet publications. Table. (L15, ST)

391-L. Electroless Nickel Plating. J. L. Chinn. *Materials & Methods,* v. 41, May 1955, p. 104-106.

Advantages and applications, plate properties. Photographs, micrograph. (L14, Ni)

392-L. Standardization of Chromium Bath Tests on a Bent Cathode in the Hull Cell. I. Development and Standardization of a Method to Evaluate Covering Power. Robert H. Rousselot. *Metal Finishing,* v. 53, May 1955, p. 50-53, 55.

Standardization of test is limited to establishing the angle of bend, the fillet radius of the apex, total current and duration and quantitative determination of covering power. Diagrams, graphs, table. (To be continued.) (L17, Cr)

393-L. Spotting-Out and Staining on Plated Work. G. B. Hogaboom, Jr. *Metal Finishing,* v. 53, May 1955, p. 54-55.

Causes of spotting that originate in the preparation of an article before plating. Photograph. (L17)

394-L. Complex Ions in Chromium Plating Solutions. Gunnar Gabrielson. *Metal Finishing,* v. 53, May 1955, p. 56-58.

Use of ion exchangers in the analysis of chromium plating baths to remove interfering ions. Tables. 23 ref. (L17, Cr)

395-L. Plating Bath Control: Past, Present and Future. Joseph B. Kushner. *Metal Finishing,* v. 53, May 1955, p. 59-63.

Control of temperature, agitation, time, electrical energy and composition in plating baths. Diagrams. (L17)

396-L. Electropolishing "Nimonic 80". K. F. Lorking. *Metal Finishing,* v. 53, May 1955, p. 64-66.

Conditions of optimum electrolyte composition, current density, cell voltage and temperature have been established. Micrograph, graphs, table. 6 ref. (L13, Ni)

397-L. Modern Electroplating Plant. W. H. Simons. *Metal Industry,* v. 86, Apr. 29, 1955, p. 333-338.

Indications of the trend of progress in the metal finishing field. Photographs. (L17)

398-L. Red Lead Paints for Galvanized Surfaces. Charles E. Cherry, Jr. *Paint and Varnish Production,* v. 45, May 1955, p. 23-26.

Five formulations and test results from their use. Photographs. (L16, L26)

399-L. Introductory Plating Studies on Protecting Molybdenum From High-Temperature Oxidation. L. E. Vaaler, C. A. Snavely, and C. L. Faust. *U. S. Atomic Energy Commission,* BMI-813, 1953, 20 p.

Electrodeposited nickel protected molybdenum from air oxidation for 100 hr. at 1800° F. Nickel was deposited on molybdenum after various pretreatments: a.c. electrolysis in hydrofluoric acid; a dip in alkaline ferricyanide solution; or a combination of anodic cleaning in alkali, a dip in nitric acid and in alkaline ferricyanide. In most cases, a thin layer of chromium or iron was deposited prior to nickel deposition. All deposits blistered when heated to 800° F. in a vacuum (100 μ) except when iron was deposited prior to the nickel. Attempts were unsuccessful to deposit copper which would not blister on molybdenum when heated. Micrographs, tables. 7 ref. (L17, Ni, Mo, Cu)

400-L. (German.) **Pickling and Etching Aluminum.** A. Blankbeizen. *Aluminium Ranshofen, Mitteilungen,* v. 3, no. 1, Feb. 1955, p. 3-4.

Procedures, bath compositions, temperatures and times of pickling and etching aluminum and its alloys. (L12, Al)

401-L. (German.) **Treatment and Corrosion Protection of Surfaces by Means of High Vacuum Vapor Metallization.** Walter Reichelt. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 268-271.

Characteristics and techniques of the process; evaporation and condensation in high vacuum; fields of application. Photographs. 2 ref. (L25)

402-L. Preparation of Metals for Painting. R. E. Shaw. *Corrosion Technology,* v. 2, May 1955, p. 136-142.

Surveys present-day techniques; includes sections on testing, economics and design considerations. Photographs, table, diagram. (L10, L12, L26)

403-L. The Prevention of Corrosion. *Institute of Marine Engineers, Transactions,* v. 67, Apr. 1955, p. 132-138.

Corrosion in air, soil and water. Protection by means of coatings. Graphs, photographs. 14 ref. (L general, R general)

404-L. Anodized Coatings: What They Are—How They Behave. I. C. C. Cohn. *Iron Age,* v. 175, May 26, 1955, p. 91-94.

Film which improves aluminum surfaces as to corrosion protection, insulation value, rectifier effect, colorability, paint-base, abrasion resistance, electroplating base, printing base and other properties. Diagram, photographs. (To be continued.) (L19, Al)

405-L. Here's How Vinyl-To-Metal Laminates Are Made and Used. *Modern Plastics,* v. 32, June 1955, p. 107-111, 230.

Light-weight luggage, fabricated of vinyl-to-magnesium laminate, is durable and scuff resistant. Photographs. (L22, Mg)

406-L. The Anti-Corrosive Value of Paints. F. Fancutt. *Paint Manufacture,* v. 25, May 1955, p. 189-194.

An international symposium of seven papers presented by the Corrosion Group of the Society of Chemical Industry. Covers priming, principles and painting practice on steel, testing and influence of constituents and formulation. (L26)

407-L. Chromium Plating of Engine Cylinders Can Slash Wear Rates, Up Economy. Russell Pyles. *Power,* v. 99, June 1955, p. 132-133.

Porous chromium is produced by electrolytic or chemical action on chromium plate on a smooth honed bore. Photograph, micrographs. (L17, Cr)

408-L. Surface Treatment and Finishing of Light Metals. XI. S. Wernick and R. Pinner. *Sheet Metal Industries,* v. 32, no. 337, May 1955, p. 345-356, 372.

Production, cooling, properties, adhesion, corrosion resistance and applications. Graphs, diagrams, micrographs, tables. 17 ref. (L19)

409-L. Modern Developments in Paint Processes. R. L. Yeates. *Sheet Metal Industries,* v. 32, no. 337, May 1955, p. 369-372.

Present trend of paint finishing is towards the use of synthetic materials and also towards the use of stoving schedules. (L26)

410-L. Phosphate Coatings for Facilitating Cold-Working. W. Rausch and H. Fleischhauer. (Translated from the German by Jerome W. Howe.) *Wire and Wire Products,* v. 30, May 1955, p. 552, 599-603.

This process creates a firm intergrowth of the coating with the material. Phosphate solutions are commonly aqueous solutions which contain a film-forming metal, preferably zinc and phosphoric acid. (L14, G21)

411-L. Hot Dip Galvanizing Is a Science. IV. Wallace G. Imhoff. *Wire and Wire Products,* v. 30 May 1955, p. 553-556, 605.

The longer the pickling time, the more zinc is deposited as galvanized coating. Tables, photographs, graphs. (L16)

412-L. (German.) **Possible Applications of Resin-Emulsion Paints.** B. Schmücker. *Fette, Seifen, Anstrichmittel,* v. 57, no. 5, May 1955, p. 335-340.

Practical results of application for special purposes such as rust-proof coatings. Photographs, micrographs. (L26)

413-L. (German.) **Electrolytic Deposition of Lead-Tin Alloy.** Ernst Raub and Walter Blum. *Metalloberfläche,* v. 9, no. 4, Apr. 1955, p. 54A-57A.

Relation of plating conditions, bath composition and temperature to composition of the deposits. Tables, graphs. 7 ref. (L17, Pb, Sn)

414-L. (Russian.) **Automatic Application of Weld-Deposited Coating on Blooming Rolls.** K. V. Bagrianskii, I. M. Kramchaninov, D. S. Kassov and V. T. Sopin. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 20-23.

Composition of welding mixture. Welding machine used. Corrosion, fracture and wear-resistance of weld-coated areas of roll. Photographs, diagrams, table, micrograph. 9 ref. (L24, ST)

415-L. (Russian.) **Problem of Obtaining High-Quality Galvanic Coatings on Parts Made of Zinc Alloys.** G. S. Vozdvizhenskii, V. A. Dmitriev, A. G. Mozhanova, E. V. Rzhevskaia and D. E. Chasov. *Zhurnal Prikladnoi Khimii,* v. 28, no. 5, May 1955, p. 484-489.

Effect on coatings of pores and slag inclusions in the castings. Proper cyanide content, temperature and pH for copper plating. Photographs, tables. 6 ref. (L16, Zn, Cu)

416-L. (Book.) **Aluminum Paint and Powder.** Junius David Edwards and Robert I. Wray. 3rd Ed. 219 p. 1955. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

Manufacture; properties; testing; applications. (L26, H10, Al)

417-L. (Book.) **Protective Coatings for Metals.** R. M. Burns and W. W. Bradley. American Chemical Society Monograph Series No. 129. 2nd Ed. 643 p. 1955. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $7.50.

Surface preparation; metallic and nonmetallic coating types; application methods and use. (L general)

418-L. Conductive Coating for Aluminum. John A. Connor and R. Stricklen. *Electrical Manufacturing,* v. 55, June 1955, p. 105-107.

Contact resistance and corrosion properties of aluminum components are improved by chromate surface conversion treatment applied by immersion at room temperature. Table, photographs, graphs. (L14, Al)

419-L. Finishes That Stand Metal Forming. F. D. Johnson. *Industrial Finishing (London),* v. 8, May 1955, p. 276, 278, 280.

Properties, application, baking and formulation of finishes for coating bottle caps, toys, etc. before metal forming. Photographs. (L26)

420-L. Stainless Steel Finishing. *Industry & Welding,* v. 28, June 1955, p. 78-82, 152.

Grinding and polishing procedures. Abrasive selection, lubrication, wheel speed. Photographs. (L10, SS)

421-L. Anodized Coatings: What They Are—How They Behave. II. C. C. Cohn. *Iron Age,* v. 175, June 2, 1955, p. 95-98.

Thickness tests, equal diffusion rates, film properties and oxide film growth. Photographs. (L19, Al)

422-L. The Formulation of Priming Paints for Structural Steel. J. C. Hudson and J. F. Stanners. *Journal of Applied Chemistry,* v. 5, Apr. 1955, p. 173-188.

Interim report of a BISRA sub-

committee recommends primer of red lead, white lead and asbestine in linseed oil for weathered steel. Tables, graphs, diagram, photographs. 4 ref. (L26, ST)

423-L. Petroleum Base Rust Preventives. *Lubrication,* v. 41, June 1955, p. 61-72.

Theory of rusting of iron and steel; preservative lubricants; preservative coatings; surface preparation prior to application of petroleum-base rust preventative; application of preventatives. Tables, photographs, micrographs. (L26, R general)

424-L. Design for Plating. J. B. Mohler. *Machine Design,* v. 27, June 1955, p. 165-168.

Types of coating, coating specifications, variation in deposit thickness, plating corners and engineering uses of plating. Tables, diagrams, photographs. 4 ref. (L17)

425-L. Surface Treatment and Finishing of Light Metals. VI. Anodizing of Aluminum. S. Wernick and R. Pinner. *Metal Finishing,* v. 53, June 1955, p. 91-98.

More important industrial anodic processes and their applications. Table, graphs, diagram. 51 ref. (L19, Al)

426-L. Standardization of Chromium Bath Tests on a Bent Cathode in the Hull Cell. II. Study of C.P. Variations Under Simple Conditions. Robert H. Rousselot. *Metal Finishing,* v. 53, June 1955, p. 99-102.

Method of plotting variations of the covering power with a satisfactory degree of precision, taking into account factors relating to the base metal and progressively varying the factor concerning the bath. Diagram, table, graphs. 7 ref. (L17, Cr)

427-L. Barrel Finishing. *Metal Industry,* v. 86, May 20, 1955, p. 419-421.

Tumbling equipment, media, operation, loading. Photographs. (L10)

428-L. Chrome Plating for the Small Shop. J. B. Mohler. *Metalworking Production,* v. 99, Apr. 15, 1955, p. 677-679.

Advantages of setting up a chromium plating department in a small shop. Diagrams, graphs. (L17, Cr)

429-L. Epoxy Coatings for Metal Decorating Finishes. M. A. Glaser, E. J. Bromstead and G. L. Weaver. *Modern Lithography,* v. 23, June 1955, p. 77, 79, 157.

Four classes of epoxy resin materials for use in metal decorating. Table, photograph. (L26)

430-L. Electrolytically Formed Coating for Magnesium Alloys. *National Bureau of Standards, Technical News Bulletin,* v. 39, June 1955, p. 77-79.

Salt spray resistant surface on magnesium by a.c. deposition in a simple electrolyte. Tables, photographs. (L17, Mg)

431-L. Corrosion Resistant Paints. Henry L. Beakes. *Official Digest. Federation of Paint and Varnish Production Clubs,* v. 27, June 1955, p. 366-370.

Properties of film, surface pretreatment, painting tips. 14 ref. (L26)

432-L. Electrostatic Paint Spray for Automatic Finishing. Irving Feldman. *Precision Metal Molding,* v. 13, June 1955, p. 63, 65-66.

A system that incorporates, in a closed circuit, cleaning, surface preparation, drying, spray painting and baking. Photographs. (L26)

433-L. Chromium Without Microporosity Plated Directly Onto Base Metal. *Precision Metal Molding,* v. 13, June 1955, p. 67-68.

Plating process that permits the deposit of a dense, nonporous layer of chromium directly onto the base metal, such as die cast alloys, steels, copper, etc. Photographs. (L17, Cr)

434-L. Fine-Scale Structures Produced on Aluminium by Electropolishing or Etching. N. C. Welsh. *Research (Supplement),* v. 8, June 1955, p. 28-29.

Study of effects of anodic treatment in several electrolytes under conditions which would produce in some cases polished surfaces and in others oxidation with little polishing action. Graph, micrograph. 11 ref. (L13, Al)

435-L. The Inert-Gas Metal-Arc Overlay Process. C. R. Felmley. *Welding Journal,* v. 34, June 1955, p. 542-550.

Factors that affect penetration with inert-gas metal-arc welding. Photographs, diagrams. (L24)

436-L. (English and Spanish.) **Hot Spray Painting.** R. H. Warring. *Machinery Lloyd (Overseas Ed.),* v. 27, May 21, 1955, p. 81-83.

By using heat, the spray contains a considerably greater proportion of solids which, with proper technique, do not sag or run; overspray is considerably reduced, with an over-all saving in production time and costs. Graph, table, diagrams. (L26)

437-L. (French.) **Study of Stria Resulting From Hot-Dip Tinning.** S. Chatel, P. Kozakevitch, and P. Roc-

quet. *Métaux, Corrosion-Industries,* v. 30, no. 354, Feb. 1955, p. 78-87.

Mechanism of formation and methods of elimination of stria formed during the coating of tin plate. Tables, diagrams, micrograph. 3 ref. (L16, Sn)

438-L. (German.) **Several Technological Properties of Flame-Sprayed Zinc Coatings.** E. Gebhardt and H. D. Seghezzi. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 162-164.

Report of experimental results on the mechanical properties of wire and powder-sprayed specimens as a function of specimen cross section and oxygen concentration of fuel mixture. Tables. 10 ref. (L23, Zn)

439-L. (Italian.) **Thickness and Piercing Voltage of an Anodized Coating.** A. Prati. *Alluminio,* v. 24, no. 2, Mar. 1955, p. 111-119.

Electric equipment employed to check the electrical properties of an anodized layer. Diagrams, tables, graphs. 7 ref. (L19, Al)

440-L. (Polish.) **Structure of Layers of Sintered Carbides Applied by the Electro-Sparking Method.** Edmund Bryjak and Witold Missol. *Hutnik,* v. 22, no. 3, Mar. 1955, p. 77-86.

Relation of surface smoothness and thickness of applied layer to the electrical parameters of the process. Radiographic investigations of cobalt content and W_2C in the layer. Micrographs, tables, diagram. 14 ref. (L general, C-n)

441-L. (Russian.) **Mechanism of Silver Electropolishing.** A. T. Vagramian and A. P. Popkov. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 297-300.

Investigation by means of polarization curves; relation of anode polarization change to current density. Polarization curves, diagram. (L13, Ag)

442-L. (Russian.) **Copper Plating of Mirrors Silvered by the Glazing Method.** R. G. Lepilina and M. T. Belousov. *Legkaia Promyshlennost',* v. 15, no. 5, May 1955, p. 41-43.

Conditions of galvanic copper plating; current density, etc., thickness and quality of resulting copper film. (L17, Cu)

443-L. **Stainless Flatware Proves That Beauty Results From Mechanized Polishing.** Rupert Le Grand. *American Machinist,* v. 99, July 4, 1955, p. 106-109.

Selection of materials, segregation of facilities and steps used to minimize the polishing operations required to make a finished product. Photographs. (L10, SS)

444-L. **Barrel Finishing.** H. B. Underhill. *Canadian Metals,* v. 18, June 1955, p. 54, 56, 57.

Advantages include savings due to reduction in direct labor costs and revealing of flaws by the cleaning and conditioning action of the process. Photographs. (L10)

445-L. **Preliminary Evaluation of Protective Coating Systems.** R. W. Flournoy. *Corrosion,* v. 11, July 1955, p. 289-290.

Tests of coatings formulated from organic materials with high electrical resistance, including determination of thickness, flaws, adhesion and chemical resistance. Photographs. (L26)

446-L. **Finishes for Aluminium.** A. W. Brace. *Engineers' Digest,* v. 16, May 1955, p. 244-247, 252.

Methods of producing finishes of both utilitarian and aesthetic value. Photographs, tables. (L general, Al)

447-L. **Surface Finishing Aluminum Castings.** John H. Keating. *Finish,* v. 12, July 1955, p. 33-36.

Polishing and buffing operations and equipment. Diagrams. (L10, Al)

448-L. **Lined Steel Shipping Containers for Hard-to-Hold Products.** L. J. Nowacki. *Industrial Packaging,* v. 1, June 1955, p. 15-18.

Development of single trip lined containers with emphasis on materials of the epoxy-phenolic type. Possible use of laminated linings in the future. Photographs. 1 ref. (L26, ST)

449-L. **Recent Developments in Chromium Plating.** H. Silman. *Institute of Metal Finishing, Bulletin,* v. 5, Spring 1955, p. 33-44.

Solutions, catalysts, baths, processes, barrel chromium plating, tampon finishing and plant requirements. Graphs. 17 ref. (L17, Cr)

450-L. **Practical Bright Nickel Plating.** T. E. Such. *Institute of Metal Finishing, Bulletin,* v. 5, Spring 1955, p. 45-64.

Advantages and disadvantages of bright as compared with dull nickel plating, merits of various plating solutions and methods for their control and purification, recommended cleaning cycles. Tables, graphs, diagram. 17 ref. (L17, Ni)

451-L. **Some Aspects of Sulphuric Acid Anodizing to Specifications D.T.D. 910C.** V. F. Henley. *Institute of Metal Finishing, Bulletin,* v. 5, Spring 1955, p. 65-70.

Technical difficulties in meeting British specifications include factors influencing the choice of the elec-

trolyte concentration, importance of agitating the electrolyte, "spotting out" of dyed coatings caused by galvanic action, dimensional changes occurring during anodizing, and a proposed method for maintaining the original dimensions. 3 ref. (L19, Al)

452-L. High-Output Plating Machine Incorporates Job Shop Flexibility. Alfred D'Agostino. *Iron Age,* v. 175, June 9, 1955, p. 75-77.

All mechanical movements are powered from a single integrated chain drive. The drive is self-compensating in that the timing function will not be affected by the normal wear of its components. Photographs, diagrams. (L17, Cr)

453-L. Corrosion Resistant Alloys Play Key Part in Pickling. *Iron Age,* v. 176, July 7, 1955, p. 94-96.

Use of corrosion resistant alloys in pumps, valves and other equipment assures continued high-speed operation with minimum maintenance. Table, photographs. (L12, SG-g)

454-L. Are Pure Oxides the Answer to High Temperature Problems? *Iron Age,* v. 176, July 7, 1955, p. 104-105.

Pure oxide coatings resistant to temperatures above 3000° F. and erosion at supersonic speeds offer new means of protecting metals in rocket and jet engine parts. Photographs, tables. (L27, Al, AY)

455-L. Metal Finishing—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2G-16G.

Past, present, and possible future trends in electroplating, cleaning, phosphating and porcelain enamels. Photographs. (L12, L14, L17, L27)

456-L. More Production Through Chemical Maintenance. A. David Nesbitt. *Iron and Steel Engineer,* v. 32, June 1955, p. 104-112; disc., p. 112-115.

Chemical cleaning of piping, open-hearth checkers and checkerwork in blast furnace stoves. Photographs, tables, graphs, diagram. 15 ref. (L12, D1)

457-L. Tests on the Relative Efficiency of Chromate Pigments in Anticorrosive Primers. H. G. Cole. *Journal of Applied Chemistry,* v. 5, May 1955, p. 197-208.

Sea-water-spray corrosion tests made on two magnesium alloys, an aluminum alloy and mild steel, painted with primers made from 17 pigments, showed best protection by strontium chromate and poorest results from three complex cadmium, three lead chromiums, and barium chromate. Tables. 14 ref. (L26, Mg, Al, CN)

458-L. Nylon-Coated Metal Parts for Wear Resistance. Louis L. Stott. *Materials & Methods,* v. 41, June 1955, p. 92-94.

Coating process makes it possible to combine the good frictional characteristics of nylon with the better dimensional stability of metals. Photographs, graph. (L26)

459-L. Finishing Aluminium. G. E. Gardam and G. L. Jones. *Metal Industry,* v. 86, June 3, 1955, p. 476-479.

Review of well-established and more recent metal finishing methods for aluminum. Photographs. 26 ref. (L17, L19, L14, Al)

460-L. Electrodeposition of Rhodium. Edward A. Parker. *Plating,* v. 42, July 1955, p. 882-892.

Methods of purification and applications which depend on decorative white finish, hardness, corrosion resistance, optical reflectivity, low electrical resistance and combinations. Tables, diagrams. 13 ref. (L17, Rh)

461-L. Cleanability and Oil Spreading Rates. Henry B. Linford and Paul E. Grubb. *Plating,* v. 42, July 1955, p. 895-902.

Development of a correlation between the spreading rate of various oils, fats and greases, which are solid at room temperature, on a particular metal with the cleanability or difficulty of cleaning that soil from another metal. Tables, graphs, diagrams. 3 ref. (L12)

462-L. pH for the Electroplater. J. B. Mohler. *Products Finishing,* v. 19, July 1955, p. 32 + 8 pages.

Importance of pH determination in terms of its effect upon chemical balance, decomposition, bath control and plating quality. Table, graph. (L17)

463-L. Pickling at Half the Cost. George S. Shephard. *Steel,* v. 137, July 4, 1955, p. 76, 79.

Pickling line installed at Pittsburgh Screw and Bolt Corp. cut pickling costs in half, increased production and upgraded product quality. Photographs. (L12)

464-L. Reactive Sputtering and Associated Plant Design. L. Holland and G. Siddall. *Vacuum,* v. 3, July 1953, p. 245-253.

Advantages, gas-metal reactions and plant design. Desirable performance features of a plant enumerated. Diagram, graph. 19 ref. (L25)

465-L. Hot Dip Galvanizing Is a

Science. V. Wallace G. Imhoff. *Wire and Wire Products,* v. 30, June 1955, p. 681-683, 726-727.

Experiment to ascertain relation between drawing time of the article galvanized and weight of the zinc deposited as galvanized coating. Tables, graphs. (L16, Zn)

466-L. Hardness of Hard Chromium Plates. H. Arend. *Henry Brutcher Translation No.* 3427, 10 p. (Abridged from *Metalloberfläche,* v. 3, no. 5, 1951, p. 72B-76B.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 462-L, 1951. (L17, Cr)

467-L. Vaporization of Metals and Metalloids in Vacuum. H. Laporte. *Henry Brutcher Translation No.* 3439, 8 p. (From *Chemische Technik,* v. 5, no. 11, 1953, p. 632-634.) Henry Brutcher, Altadena, Calif.

Data on melting point, boiling point, vapor pressure, volume change on fusion, pressure coefficients of melting point and corresponding temperatures of a number of metals and metalloids. Tables. 3 ref. (L25, C25, P12)

468-L. Selection of the Most Favorable Conditions for Porous Chromium Plating. G. K. Shvyryaev and M. A. Shluger. *Henry Brutcher Translation No.* 3482, 9 p. (Condensed from *Vestnik Mashinostroeniya,* v. 34, no. 5, 1954, p. 64-68.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 733-L, 1954. (L17, Cr, ST)

469-L. On the Adhesion of Nickel-Chromium Electrodeposits. A. von Krusenstjern. *Henry Brutcher Translation No.* 3489, 3 p. (From *Metalloberfläche,* v. 5, no. 10, 1953, p. 153B-154B.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 735-L, 1953. (L17, Cr, Ni)

470-L. The 'D' Chromium Plating Process. A. Kutzelnigg. *Henry Brutcher Translation No.* 3491, 7 p. (Abridged from *Metalloberfläche,* v. 5, no. 10, 1953, p. 156B-160B.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 736-L, 1953. (L17, Cr)

471-L. Study of the Effect of High-Frequency Alternating Current on the Electrodeposition of Chromium. R. Bilfinger. *Henry Brutcher Translation No.* 3492, 10 p. (From *Archiv für Metallkunde,* v. 2, no. 4, 1948, p. 131-135.) Henry Brutcher, Altadena, Calif.

Effect of current density upon current efficiency and throwing power of chromium plating baths containing various quantities of foreign acid, in the presence and absence of high-frequency alternating current. Micrographs, tables, photographs, circuit diagram. (L17, Cr)

472-L. Investigation of Electrobrightening of Metals. P. V. Shchigolev and N. D. Tomashov. *Henry Brutcher Translation No.* 3502, 7 p. (Condensed from *Doklady Akademii Nauk SSSR,* v. 100, no. 2, 1955, p. 327-330.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 249-L, 1955. (L13, Cu, Ni, Zn)

473-L. Causes of Defects in Phosphate Coatings. E. Wagner. *Henry Brutcher Translation No.* 3507, 7 p. (Abridged from *Mitteilungen Forschungs - Gesellschaft Blechverarbeitung,* 1954, no. 7, p. 79-82.) Henry Brutcher, Altadena, Calif.

Possible faults in the various stages of activated hot phasphating, using zinc phosphate solutions, and hints for avoiding them. (L14)

474-L. (Czech.) **Use of Basalt Jets for Pneumatic Drum Fettling Machines.** Otakar Micanik. *Slévarenstvi,* v. 3, no. 5, May 1955, p. 133-135.

Jets stand 20 times more than cast iron jets during uninterrupted operation; output of machines has increased because formerly it was necessary to exchange cast iron jets every 3 hr. Diagrams, table. 3 ref. (L10)

475-L. (French.) **Strengthening of the Oxide Film on Tin to Improve Corrosion Resistance.** S. C. Britton. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 134-138.

Addition of alloy elements to the metal; chemical and electrochemical treatment of the surface; treatment of tin in a film-forming solution. (L14, Sn)

476-L. (French.) **Contribution to the Study of Electrolysis in Very Concentrated Solution. Example of Electrolytic Polishing.** Philippe Brouillet. *Métaux, Corrosion-Industries,* v. 30, no. 356, Apr. 1955, p. 141-154.

Phenomena at the electrodes during electrolysis based on existence of a layer of adsorbed ions at the surface of the metal. Diagrams, tables. 34 ref. (To be continued.) (L13)

477-L. (German.) **Several Processes for Determining the Quality of Eloxation Films.** F. Baumann and R.

Lattey. *Aluminium,* v. 31, no. 5, May 1955, p. 199-204.

Methods of measuring thickness, corrosion and wear resistance, porosity and electrical properties of anodic coatings on aluminum. Photographs, tables, graphs. 14 ref. (L19, Al)

478-L. (German.) **Present Status of Mechanical Surface Treatment.** H. H. Finkelnburg. *Metall,* v. 9, nos. 11-12, June 1955, p. 466-471.

Review of cutting and noncutting methods of changing or improving the surfaces of metals. Micrographs, table, diagrams, photographs. 4 ref. (L10)

479-L. (German.) **Innovations in the Practice of Grinding and Polishing.** W. Burkart. *Metall,* v. 9, nos. 11-12, June 1955, p. 472-473.

New polishing methods and materials. Micrographs. (L10)

480-L. (German.) **Modern Surface Treatment in Automobile Manufacturing.** M. Eitel. *Metall,* v. 9, nos. 11-12, June 1955, p. 474-478.

Methods of shaping, cleaning and coating automotive parts by mechanical, chemical and thermal means. 7 ref. (L general)

481-L. (German.) **The Surface Treatment in the Electric Industry, With Special Consideration of the Telecommunications Industry.** K. Leich. *Metall,* v. 9, nos. 11-12, June 1955, p. 478-482.

Functions of coating metals with nickel, zinc, cadmium, copper, chlorine, tin, aluminum, noble metals, and inorganic and organic nonmetallic substances, metal coatings on nonconductors, and various noncoat-forming surface treatments. 34 ref. (L general, T1)

482-L. (German.) **Degreasing Metal Parts With Solvent Vapor.** A. Arnold. *Metall,* v. 9, nos. 11-12, June 1955, p. 483-486.

Description and evaluation of different methods of removing films of oil and fat with vaporized solvents. (L12)

483-L. (German.) **Modern Metal Spraying for Rust Protection in Austria.** H. Reininger and R. Rengshausen. *Metall,* v. 9, nos. 11-12, June 1955, p. 487-488.

Evaluation of sprayed zinc and aluminum coatings. Photographs. 12 ref. (L23, Al, Zn)

484-L. (German.) **Corrosion Protection by Cold Zinc Coating.** I. C. Fritz. *Metall,* v. 9, nos. 11-12, June 1955, p. 488-489.

Evaluation of protective effect and properties of zinc-dust paint and zinc-paste coatings. Photographs. 6 ref. (L26, Zn)

485-L. (German.) **Modern Processes of Producing Tin-Plated Sheet Metal.** B. Keysselitz. *Metall,* v. 9, nos. 11-12, June 1955, p. 490-491.

Methods and equipment of tinplating sheet iron in "Ferrostan", halogen and alkaline baths. Diagrams, photographs. (L17, Sn)

486-L. (German.) **Limitations in the Use of Flame Spraying.** Hans von Hofe. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 180-188.

Principle of metal spraying and its proper uses as a protection against rusting, corrosion and scaling, for applying decorative and wear resistant coatings and bearing metals, for forming molds, and for the application of electrically conducting films and screens in the electrical and electronic industry. Photographs, graphs, table. 4 ref. (L23)

487-L. (German.) **Zinc-Coating Plants for Tubes.** Josef Leutbecher. *Stahl und Eisen,* v. 75, no. 12, June 16, 1955, p. 777-779.

Details of operation, mechanical equipment with a view to most economical production, output of the plant, and other characteristic data. Diagrams, photographs. (L16, Zn)

488-L. (Russian.) **Problem of the Choice of the Optimum Smoothness of Finish of Friction Surfaces.** M. A. Ryzhik. *Avtomobil'naia promyshlennost,* 1955, no. 5, May, p. 20-22.

Polishing and grinding prescriptions established in connection with dimensions and rotations of parts; wear tests. Photographs. 4 ref. (L10, Q9, S15)

489-L. (Russian.) **Effect of Electropolishing on the Physicochemical Properties of Pure Aluminum Surfaces.** P. V. Shchigolev. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 4, Apr. 1955, p. 682-684 + 1 plate.

Coefficient of light reflection and the electrical resistance of the surface of electrolytically polished aluminum. Electronographic and X-ray studies of the oxide layer structure on electropolished aluminum, and comparisons made with mechanical processes. Graphs, micrographs. 3 ref. (L13, Al)

490-L. (Pamphlet.) **A Study of the Effect of Chromic Acid; and Chromic-Phosphoric Acid Rinse Solutions Upon Subsequently Applied Paint Coatings.** 23 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

Salt spray, water immersion, and outdoor exposure tests, conducted to determine the best treatment for ordnance equipment, indicate that good protection against corrosion and paint flaking can be secured by rinsing the previously phosphated surfaces with high-strength solutions of chromic and chromic-phosphoric acid. Details of solutions, methods of application, and results obtained are outlined. (L26)

491-L. (Book.) **Vapor-Plating.** C. F. Powell, I. E. Campbell, and B. W. Gonser. Electrochemical Society Series. 158 p. 1955. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $5.50.

With emphasis on the chemical process involved, rather than the physical, a unified picture is presented of the principles, techniques, and conditions required for the deposition of pure metals, carbides, nitrides, borides, silicides, and oxides from gaseous mixtures of their vaporized compounds. Summarizing the properties of the resulting coatings and materials, new applications for the process are suggested. (L25)

492-L. **Effect of Oxygen Content of Furnace Atmosphere on Adherence of Vitreous Coatings to Iron.** A. G. Eubanks and D. G. Moore. *American Ceramic Society, Journal,* v. 38, July 1955, p. 226-230.

Use of porcelain enamel ground coats, with varying amounts of cobalt oxide, showed that optimum adherence necessitated increasing the oxide if the oxygen were decreased. A qualitative correlation was found between adherence and surface roughness, regardless of the oxygen content of the firing atmosphere. Photograph, diagram, graphs, tables, micrographs. 22 ref. (L27, Fe)

493-L. **Paint Faults and Remedies. II. Peeling.** H. Courtney Bryson. *Corrosion Prevention and Control,* v. 2, June 1955, p. 27-31, 41.

Requisites for obtaining good adhesion include preparation of a clean surface, immediate application of paint, use of corrosion resistant primer and a good top coat. Photograph. (L26)

494-L. **Developments in Preparatory Treatments. II. Chemical.** *Corrosion Prevention and Control,* v. 2, June 1955, p. 37-39.

General methods and tests, oxide film effect, pickling studies, ultrasonic cleaning and specific treatment for aluminum and aluminum alloys. (To be continued.) (L12, L10, ST, Al)

495-L. **Corrosion Prevention Practice. IV. Protecting a Tanker.** *Corrosion Prevention and Control,* v. 2, June 1955, p. 40-41.

Use of Epikote resin based coating, cathodic protection and metal sprayed coating in tests for corrosion prevention in ballast tanks. Photograph. (L23, L26, R10)

496-L. **A Method for the Isolation of Surface Films From Aluminum Alloys and the Mechanism of the Reactions Involved.** M. J. Pryor and D. S. Keir. *Electrochemical Society, Journal,* v. 102, July 1955, p. 370-381.

Use of warm solutions of iodine in methanol for isolating surface films not containing copper. A mechanism for the dissolution of aluminum in iodine-methanol solutions is suggested. Tables, graphs, photographs. 29 ref. (L14, Al)

497-L. **Brightening Agents for the Tin-II Sulfate-Sulfuric Acid Electrolyte.** C. A. Discher and F. C. Mathers. *Electrochemical Society, Journal,* v. 102, July 1955, p. 387-389.

Concentration ranges of electrolyte and operating conditions, properties of the electrodeposit, role played by each of the addition agents. 6 ref. (L17, Sn)

498-L. **Product Design for Organic Finishing.** F. C. Ashford. *Electroplating and Metal Finishing,* v. 8, July 1955, p. 254-257.

Correlation of finishing scheme with form of the article, effects of component shape, color selection. Diagrams, photograph. 1 ref. (L26)

499-L. **A Review of the Use of Molybdenum in Metal Spraying.** Sheila M. Holgate. *Electroplating and Metal Finishing,* v. 8, July 1955, p. 258-262.

Properties and applications of sprayed molybdenum, spraying techniques, factors governing the adhesions of the coatings. 7 ref. (L23, Mo)

500-L. **Blast Equipment Maintenance Can Save You Money.** L. M. Johns. *Foundry,* v. 83, July 1955, p. 128-129.

Batch and continuous-type blast barrel cleaning used in foundry cleaning rooms. Photograph. (L10)

501-L. **Plating Machine Design Leads to High Anodizing Rates.** Paul Pearson. *Iron Age,* v. 175, June 30, 1955, p. 59-61.

With an anodizing setup, based on a return-type electroplating machine design, coating uniformity and quality are considerably superior, maintenance is negligible, and, being cus-

tom built, the system makes good use of floor space. Diagram, photographs. (L19, Al)

502-L. Metal Finishing: New Developments Shape Future Trends. J. J. Obrzut. *Iron Age,* v. 176, July 14, 1955, p. 106-107.

Recent developments in plating machinery, control instruments and chemicals and processes for use in plating and finishing. (L general)

503-L. Coatings; Good Structural Design Aids Battle Against Corrosion. C. G. Munger. *Iron Age,* v. 176, July 14, 1955, p. 108-111.

Angles, corners, welds, rivets and edges are major trouble spots in coating steel structures and, consequently, the coating material quality is not as important as is the design of the structure. Diagrams, photographs. (L general)

504-L. New Clad Metals Made by Vacuum Brazing. Kenneth Rose. *Materials & Methods,* v. 42, July 1955, p. 100-102 .

Metals and sizes, bonding method and properties of composites in new cladding process. Photographs. 3 ref. (L22)

505-L. Electrodeposition of Nickel From Fluoborate Solutions. C. B. F. Young and William Strobach. *Metal Finishing,* v. 53, July 1955, p. 44-50.

Investigates effect of bath composition and concentration, temperature, current density, pH, agitation and addition agents. Tests on ductility of deposits, their uniformity of thickness and ability to be buffed and to accept a chromium plate. Graphs, table. (To be continued.) (L17, Ni)

506-L. Bronze Plating: Why and How. Frederick A. Lowenheim. *Metal Finishing,* v. 53, July 1955, p. 51-52, 58.

Numerous applications, principal features. Photograph. 7 ref. (L17, Cu)

507-L. The Slot Cell. J. B. Mohler. *Metal Finishing,* v. 53, July 1955, p. 53-58.

Testing procedure, plating and bath standards, operating current density, plating control practice. Diagrams, graphs, table. 10 ref. (L17)

508-L. Electroless Chromium. Harry J. West. *Metal Finishing,* v. 53, July 1955, p. 62-63.

Construction of plating tank, bath solution, cleaning of pieces before plating; advantages. (L14, Cr)

509-L. Instrumentation in Electroplating. J. L. M. Fletcher. *Metal Industry,* v. 86, June 24, 1955, p. 533-537.

Part that instruments play in different finishing processes and particularly their role in future developments. Diagram, photographs. (L17, S14)

510-L. Cleaning With Ultrasonics. Frank W. Hightower. *Metal Progress,* v. 68, July 1955, p. 99-104 .

Use of ultrasonic cleaning where the surfaces to be cleaned are not readily accessible or when they must be scrupulously clean, as in plating or adhesive bonding. Photographs, graphs. (L10)

511-L. Nickel Plating by Chemical Reduction. W. J. Crehan. *Product Engineering,* v. 26, July 1955, p. 148-152.

Results in greater corrosion protection and more uniformity in plate thickness over surface areas of intricate parts than can be accomplished with electroplating. Close-tolerance machined parts can be plated without requirement for post-machining or finishing, provided care is exercised in setting up the plating bath. Tables, graphs, photographs, diagrams. 4 ref. (L14, Ni)

512-L. Enameling of Zirconium. J. Schultz, H. P. Tripp, B. W. King and W. H. Duckworth. *U. S. Atomic Energy Commission, BMI*-994, Apr. 27, 1955, 22 p.

Major problems in enameling zirconium with adherent, defect-free coatings resulted from relatively low coefficient of thermal expansion of zirconium, directional thermal-expansion properties of rolled zirconium, undesirability of using enamel components of high thermal-neutron-absorption cross section and desirability of fusing the enamel below 1475° F. to avoid the alpha-beta transformation of zirconium when firing the coating. These problems were solved by suitable heat treatment of the zirconium to reduce directional properties and the use of lead-silicate type of enamel. (L27, Zr)

513-L. Tentative Specifications for Asphalt-Base Emulsions for Use as Protective Coatings for Metal. Paper from "ASTM Standards on Paint, Varnish. Lacquer, and Related Products". p. 499-500.

Specifications cover asphalt-base emulsions capable of being applied in relatively thick films. Tables. (L26, S22)

514-L. Tentative Methods of Testing Bituminous Emulsions for Use as Protective Coatings for Metal. Paper from "ASTM Standards on Paint, Varnish, Lacquer and Related Products". p. 505-508.

Procedures for testing bituminous

emulsions for use in relatively thick films. (L26)

515-L. (Dutch.) **Spray Silvering of Mirrors Saves Time and Materials.** *Bedrijf en Techniek,* v. 10, no. 229; *Electronica section,* v. 8, no. 176, June 4, 1955, p. 275, 282.

Procedure of spraying silver for the production of different types of mirrors and advantages of the process. 2 ref. (L23, Ag)

516-L. (French.) **Restoration of Grooves by Welding.** H. Charbonnier. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 12, no. 5, 1955, p. 1021-1030.

Repair of rolling-mill rolls by submerged-arc deposition of wear-resistant metal. Diagrams. (L24, F23)

517-L. (German.) **Weights of Deposits, Yields, and Losses in the Wire-Spraying Process.** Hans Reininger. *Metalloberfläche,* Ausgabe B, v. 9, no. 6 June 1955, p. 81-85.

Experiments on the amount of metal deposited by the metal-spraying process and suggestions for improving the economy of metal spraying. Tables, graphs, diagrams. 9 ref. (L23)

518-L. (German.) **Corrosion-Resistant Coatings of Paint on Aluminum.** Heinz Anders. *Metalloberfläche,* Ausgabe B, v. 9, no. 6, June 1955, p. 85-87.

Treatment of aluminum exposed to different types of corroding influences; classes of suitable coatings and their characteristics. 3 ref. (L26, Al)

519-L. (German.) **Galvanic Nickel Deposits From Chloride and Sulfate Solutions.** Ernst Raub. *Metalloberfläche,* Ausgabe A, v. 9, no. 6, June 1955, p. 88-93.

Comparison of nickel chloride with nickel sulfate from the standpoint of economy of nickel plating and hardness of nickel deposit. Graphs, tables. 6 ref. (L17, Ni)

520-L. (German.) **Polishing Agents for Metal Surfaces. Silicone Polishes.** Fritz Ohl. *Metalloberfläche,* Ausgabe A, v. 9, no. 6, June 1955, p. 93-95.

Effect and advantages of silicone-containing polishing agents. (L10)

521-L. (German.) **Surface Protection of Work Pieces in the Manufacturing Processes of Mechanical Engineering.** Burchard Van der Bruggen. *Werkstoffe und Korrosion,* v. 6, no. 5, May 1955, p. 223-227.

Reduction of costs by application of a paint or varnish protective coating on cast iron work pieces while in the manufacturing process. Diagrams, graphs, table. (L26, CI)

522-L. (German.) **Corrosion and Heat Resistance of Carbon and Special Steel After Technochemical Surface Treatment.** Walther Köhler. *Werkstoffe und Korrosion,* v. 6, no. 5, May 1955, p. 228-236.

Formation and structure of surface layers. Corrosion and heat resistance of cemented, nitrided, cyanided, aluminized, chromized, siliconized, beryllized, molybdenized, tungstenized, or vanadized carbon and special steels. Tables. 75 ref (L15, ST)

523-L. (Italian.) **Simultaneous Electrodeposition of Two Metals With Special Reference to Tin Alloys.** E. S. Hedges. *Metallurgia italiana,* v. 47, no. 5, May 1955, p. 197-199.

Theoretical and practical aspects; examples of tin with copper, zinc, nickel, cobalt, lead, and cadmium. 4 ref. (L17, Sn)

524-L. (Italian.) **Research on the Electrochemical Behavior of Tin. I.** R. Piontelli, G. Serravalle and R. Ambrosetti. *Metallurgia italiana,* v 47, no. 5, May 1955, p. 200-203.

Results of experiments on kinetic and structural aspects of electrodeposition of tin alloys by measuring polarization, anodic and cathodic voltages. Diagrams, tables, graphs. 4 ref. (L17, Sn)

525-L. (Italian.) **Considerations on the Electrodeposition of Alloys.** R. Piontelli. *Metallurgia italiana,* v. 47, no. 5, May 1955, p. 204-209.

Formation of alloys by electrodeposition; kinetic and theoretical aspects. Diagram. 4 ref. (L17, Sn)

526-L. (Italian.) **Compared Fields of Application of Electrolytic and Hot-Dip Tinplate.** W. R. Lewis. *Metallurgia italiana,* v. 47, no. 5, May 1955, p. 210-215.

Use of tin plate in drawing, shearing, welding and lacquering processes. Micrographs, photograph, diagram, graph. (L16, L17, Sn)

527-L. (Polish.) **Steel Pickling in Acid Solutions.** J. Foryst. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 152-156.

Determination of effective pickling inhibitors for carbon and low alloy steels and their effects on brittleness. Difficulties arising from pickling high-silicon iron sheets are attributed to structure and chemical composition of the scale formed during annealing. Graphs, micrographs, diagram. 7 ref. (L12, Q23, CN, AY)

528-L. (Polish.) **Diffusion Coating of Steel and Chromite Treatment of Zinc Alloys.** E. Gasior. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 157-163.

Development, properties and evaluation of chromium and aluminum coating methods as anticorrosive measures; inspection and regeneration of chromizing baths and the effect of coatings on the anticorrosive value of zinc alloys. Graphs, micrographs, diagram, table. 32 ref. (L15, ST, Zn)

529-L. (Russian.) **Mechanism of Zinc Electropolishing.** A. T. Vagramian and A. P. Popkov. *Doklady Akademii Nauk SSSR,* v. 102, no. 3, May 21, 1955, p. 547-549.

Relation of anode polarization and surface glitter to electrolysis time; contrast with mechanism of silver electropolishing. Polarization curves. 8 ref. (L13, Zn, Ag)

530-L. Chemical Cleaning and Painting of Railroad Bridges. Joseph Bigos. *American Railway Engineering Association, Bulletin,* v. 57, no. 523, June-July 1955, p. 1-14.

Suitability of painting chemically cleaned and pretreated surfaces, in comparison with surfaces cleaned by hand-chipping and wire-brushing methods; Evaluation of the performance of a number of paints and coatings. Tables, diagrams, photographs. (L10, L12, L26)

531-L. Photochemical Degradation of Automobile Lacquers. Roger L. Saur. *ASTM Bulletin,* 1955, no. 207, July, p. 61-65.

Experiments show that ordinary weathering is due to light, oxygen and water. A proposed deterioration mechanism accounts for these, of which the absence of any one greatly inhibits degradation. Micrograph, diagram, graphs, photograph. (L26)

532-L. Photo-Oxidative Degradation of Alkyd Films. E. B. FitzGerald. *ASTM Bulletin,* 1955, no. 207, July, p. 65-76.

Physical effects of degradation in alkyd films quantitatively related to the conditions and chemical mechanisms that produce them. Micrographs, graphs, tables. 12 ref. (L26)

533-L. Hardfacing With the Oxy-Acetylene Flame. E. Ryalls. *British Welding Journal,* v. 2, July 1955, p. 298.

Details preparation and flame manipulation. Diagram. (L24)

534-L. Liquid Neoprene Coatings. *Corrosion Technology,* v. 2, July 1955, p. 213-217.

Properties and capabilities of the coatings; case histories. Table, photographs. 3 ref. (L26)

535-L. Prevention of Paint Failures. II. Faults Due to Brush and Dip Application. *Industrial Finishing,* v. 8, June 1955, p. 322-325.

Choice, preservation, use of brushes; causes of wrinkling and alligatoring; effects of atmosphere; choice and design of dipping tanks; effects of withdrawal rates and ventilation. Photographs, diagram. (L26)

536-L. Electrochemical Principles of Metallic Coatings. II. Mechanism of Protective Action of Metallic Coatings. L. L. Shreir. *Industrial Finishing,* v. 8, June 1955, p. 326 + 4 pages.

Polarization and its effect on protection, theory of corrosion cells of two metals in contact, determining factors of corrosion potentials. Graphs, table, diagrams, 15 ref. (L general, R1)

537-L. On the Electrodeposition of Tungsten-Cobalt Alloys From Aqueous Solutions. T. P. Hoar and I. A. Bucklow. *Institute of Metal Finishing, Transactions, Advance Copy No.* 5, v. 32, 1955, 20 p.

Equipment, materials and operating procedures. Tables, graphs. 24 ref. (L17, W, Co)

538-L. Electroforming in Electronic Engineering. P. M. Walker, N. E. Bentley, and L. E. Hall. *Institute of Metal Finishing, Transactions, Advance Copy No.* 11, v. 32, 1955, 15 p. + 4 plates.

Choice and preparation of mandrels, copper plating solutions, process control procedures, advantages. Photographs, diagram, graphs, tables. 2 ref. (L18, Cu)

539-L. The Electron Microscope in the Study of Paints. N. D. P. Smith. *Institute of Metal Finishing, Transactions, Advance Copy No.* 12, v. 32, 1955, 10 p. + 6 plates.

Theory of the electron microscope, special specimen techniques, including a method of mounting pigments and a surface replica technique. Micrographs, 7 ref. (L26, M21)

540-L. A Study of Cracking in Chromium Deposits. H. Fry. *Institute of Metal Finishing, Transactions, Advance Copy No.* 2, v. 32, 1955, 21 p. + 2 plates.

Observations of the thickness of deposit at which cracking first occurs, of the relation between cracks and striations parallel to the basis metal apparent in etched cross-sections of deposits, and of stress as a

function of deposit thickness. Tables, graphs, micrographs. 14 ref. (L17, Cr)

541-L. Alkaline Solutions: What to Use for Effective Cleaning. J. B. Mohler. *Iron Age,* v. 176, July 28, 1955, p. 59-62.

Parts may be cleaned in alkaline solutions, electrolytically, by means of a steam gun, soaking, spraying, tumbling or scrubbing. In most cases, alkaline cleaning consists of four steps—clean, rinse, hot rinse, and dry—but the procedure may vary with the base metal and contaminant present. Four chemicals—sodium hydroxide, sodium metasilicate, trisodium phosphate and sodium carbonate—plus a wetting agent, will do most metal cleaning jobs. Tables, graphs. (L12, L13)

542-L. Recent Developments in Chromium Diffusion. I. Factors Controlling Processing Technique. R. L. Samuel, N. A. Lockington and H. Dorner. *Metal Treatment and Drop Forging,* v. 22, June 1955, p. 233-236.

How the conditions of processing have to be chosen according to the steel compositions and the type of coating desired, how the problems of economically treating a great variety of articles, in large or small batches, were solved. Diagram, table. 3 ref. (L15, Cr)

543-L. Cleaning and Finishing Practice for Phosphated Zinc-Coated Sheets. W. E. McFee. *Organic Finishing,* v. 16, July 1955, p. 11, 13.

Types of cleaners used, methods of cleaning, type of coating to use, methods of applications for best results. Photographs. (L12, L26)

544-L. Finishing Ductile Iron. John Starr. *Organic Finishing,* v. 16, July 1955, p. 12-13.

Factors to consider when finishing castings with organic coating materials. Photographs. (L26, CI)

545-L. Efficiency of Chromate Pigments as Anti-Corrosion Agents. George W. Grupp. *Organic Finishing,* v. 16, July 1955, p. 14-15.

Results of seawater spray corrosion tests made with 18 different chromate pigments. Tables. (L14, R11)

546-L. Give Your Pipe Coating a Chance. Warren D. Palmer. *Pipe Line News,* v. 27, May 1955, p. 45-46, 48, 2A.

Importance of independent supervision, inspection and field control in the various processes of pipe line construction. (L26, R8)

547-L. Finishes for Metals. Processes and Equipment. Robert A. Wason. *Tool Engineer,* v. 35, Aug. 1955, p. 111-120.

Methods and equipment for cleaning and painting. Photographs, diagrams. (L12, L26)

548-L. Hot Dip Galvanizing Is a Science. VI. Wallace G. Imhoff. *Wire and Wire Products,* v. 30, July 1955, p. 787 + 6 pages.

Relationship of thickness of coating to submersion time, metal thickness and bath temperature to coating thickness, and withdrawal time to weight of metal deposited. (L16)

549-L. Plating and Cladding of Beryllium. J. T. Stacy. Paper from "The Metal Beryllium". American Society for Metals, p. 295-303.

Studies of cladding beryllium with thin protective layers of suitable corrosion resistant metals by such methods as electroplating, roll cladding, deposition from a carbonyl and dip coating. Metals used in plating, preparation of surfaces, plating procedures, properties of electroplates and surface finishes. Results obtained in roll cladding beryllium with aluminum, nickel. (L17, L22, L16, Be)

550-L. (English.) **Formation of the Intermetallic Compound PtZn at Room Temperature.** H. H. Uhlig, J. S. MacNairn and D. A. Vaughn. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 302-304.

Made by electrodepositing zinc on platinum cathodes up to 100° C. Ease and rate of formation is anomalous for platinum. Table, micrographs. 8 ref. (L17, Pt, Zn)

551-L. (English.) **The Anodic Behaviour of Iron-Chromium Alloys in Sulphuric Acid Solution. II. Effect of Chlorine Ions in Electrolytes.** Susumu Morioka and Kazutaka Sakiyama. *Technology Reports, Tohoku University,* v. 19, no. 2, 1955, p. 224-238.

A study of the degree of anodic polarization, critical current density for passivity, strong oxidizing action of chlorine atoms discharged and adsorbed on the anode and reducing action of chlorine ions. Diagrams, graphs. 2 ref. (L19, Cr, Fe)

552-L. (French.) **Galvanization of Castings.** *Métallurgie et la construction mécanique,* v. 87, no. 6, June 1955, p. 535, 537, 539-540.

Critical analysis of methods used. Tables, micrographs. (L16, CI, Zn)

553-L. (French.) **Anodic Oxidation of By-Products Obtained From Oxidized and Sintered Aluminum.** J. Héren-

guel, P. Lelong and M. Le Nouaille. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 369-374; disc., p. 374.

Effect of current density on film color, influence of primary-oxide films in the metals, conditions of anodic oxidation and factors characterizing the sintered products. Graphs, photographs. 6 ref. (L19, Al)

554-L. (German.) **On the Resistance to Weathering of Gray-Paints by Brushing and Spraying Processes.** Karl Buser. *Werkstoffe und Korrosion,* v. 6, no. 6, June 1955, p. 281-282.

Effect of coating methods on the resistance to weathering of anti-rust paints. In weathering experiments, brushed coats proved to be generally better than sprayed ones. (L26)

555-L. (Russian.) **Investigation of the Effect of the Periodic Variation of Current Direction in the Electrolytic Deposition of Copper From Sulfate Baths.** Iu. Ia. Vene and S. A. Nikolaeva. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 5, May 1955, p. 811-817 + 3 plates.

Variations in coarseness of crystalline structure of deposits under varying electrolytic conditions. Graphs, micrographs, tables, diagram. 10 ref. (L17, M26, Cu)

556-L. (Russian.) **Problem of the Throwing Power of Electrolytes.** L. I. Kadaner. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 5, May 1955, p. 832-838.

Factors affecting distribution of current and metal on electrode surfaces; critique of previous methods of measuring dispersibility of electrolytes. Circuit diagram. 16 ref. (L17)

557-L. Corrosion Keys: Surface Coatings. Aluminum-Bronze Alloys. Karl Bennung, Bruce Fader, Frank McElroy and I. S. Levinson. *Chemical Processing,* v. 18, July 1955, p. 74, 76, 78.

Neoprene, vinyl, epoxy and Hypalon coatings compared; aluminum-bronze alloys listed in 16 media. Graphs. (L26, Cu)

558-L. Corrosion in the Brewery. II. The Brewhouse. D. H. Edmonds. *Corrosion Prevention and Control,* v. 2, July 1955, p. 33-36, 54.

Use of zinc-rich paint and plastic-based coatings on fermenting vessels and other equipment. Photographs. (To be continued.) (L26, R4, R5)

559-L. Paint Faults and Remedies. XII. Peeling on Non-Ferrous Metals. H. Courtney Bryson. *Corrosion Prevention and Control,* v. 2, July 1955, p. 37-40.

Cleaning and pretreatment procedures which will prevent peeling; priming coats for wood. Tables. (To be continued.) (L12, L26, EG-a)

560-L. Developments in Preparatory Treatments. II. Chemical: Cleaning and Pickling. *Corrosion Prevention and Control,* v. 2, July 1955, p. 41-43.

Cleaning and conditioning cycles before electroplating copper, magnesium, molybdenum, steel, titanium or zinc. 15 ref. (L12, L17, Cu, Mo, Mg, ST, Ti, Zn)

561-L. The Athyweld Process. *Edgar Allen News,* v. 34, July 1955, p. 154-156.

Application of weld deposited coatings to salvage worn-out cutting tools. Photographs, diagram, table. (To be continued.) (L24)

562-L. Electrodeposition of Molybdenum Alloys From Aqueous Solutions. D. W. Ernst, R. F. Amlie and M. L. Holt. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 461-469.

Nickel-molybdenum, cobalt-molybdenum and iron-molybdenum alloys were electrodeposited from aqueous solutions containing sodium molybdate, the sulfate of the codeposited metal, sodium citrate and ammonium hydroxide. Diagrams, tables, graphs, micrograph. 13 ref. (L17, Mo)

563-L. Periodic Current Reversal in Plating Copper-Lead Alloys. Nelson W. Hovey, John L. Griffin and Albertine Krohn. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 470-473.

Apparatus, based on the commutator principle, designed and constructed to convert direct current to square-wave alternating current, applied in electrodepositing the alloys from a cyanide-tartrate solution. Diagrams, photographs. 3 ref. (L17, Cu, Pb)

564-L. The Influence of a Surface Active Agent on the Electropolishing of Copper. K. F. Lorking. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 479-484.

Evidence indicates that the cationic surface active agent, cetyl trimethyl ammonium bromide, is adsorbed at both the anode surface and on the walls of oxygen bubbles. These factors are shown to account for the improvement in the micropolishing characteristics of the bath and in the reduction in the size of the pits formed on the anode during slow oxygen evolution. Diagrams, graphs, tables. 12 ref. (L13, Cu)

565-L. Gas Furnaces Used for Aluminum Coating Process. Arthur Q. Smith. *Industrial Heating,* v. 22, July 1955, p. 1380 + 5 pages.

Furnaces for processing; equipment for preparing metal surfaces; advantages of the processes. Photographs. (L16, Al)

566-L. Sodium Hydride Descaling of Titanium. W. J. Barth and A. L. Feild, Jr. *Metal Progress,* v. 68, Aug. 1, 1955, p. 114-116.

When sodium hydride is used to descale titanium, hydrogen will be absorbed by the metal as soon as the scale is entirely removed. To minimize hydrogen absorption, the descaling cycles should always be held to the shortest time required for scale removal. Tables, graphs. (L12, Ti)

567-L. Corrosion Resistance of Sprayed Coatings of Austenitic Steel. O. van Rossum. *Henry Brutcher Translation No.* 3433, 6 p. (Abridged from *Metalloberfläche,* v. 5, no. 5, 1951, p. 113A-115A.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 804-L, 1951. (L23, R general, SS)

568-L. Electrospark Hard Facing for Improved Erosion Resistance of Parts of Heat and Water Power Plants. A. D. Moiseev. *Henry Brutcher Translation No.* 3506, 6 p. (Abridged from *Vestnik Mashinostroeniya,* v. 35, no. 2, 1955, p. 55-57.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 256-L, 1955. (L general, AY)

569-L. (French.) **The Anodic Oxidation of the Cast Irons and a Measurement of the Rate of Anodic Oxidation by Photoelectric Reflectometry.** André Roos. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 467-472.

Measurement by means of a photoelectric cell, description of proposed device. Diagrams, graphs, micrographs, photograph. 6 ref. (L19, R11, CI)

570-L. (Russian.) **Cathode Polarization During the Deposition of Molybdenum Alloys With Metals of the Iron Group, From Aqueous Citrate and Ammonium Electrolytes.** T. F. Frantsevich-Zabludovskayaia. *Zhurnal Prikladnoi Khimii,* v. 28, no. 7, July 1955, p. 700-710.

Polarization curves, variation of molybdenum concentration in solution. Graphs, tables. 15 ref. (L17, Mo, Ni, Fe)

571-L. (Russian.) **The Nature of Coatings Formed During the Anode Oxidation of Magnesium and Its Alloys in Chromium Oxide Solutions.** B. A. Pospelov. *Zhurnal Prikladnoi Khimii,* v. 28, no. 7, July 1955, p. 748-750.

Analysis of the water-soluble and acid-soluble portions of the black coatings; chemical composition of coatings. Tables. 2 ref. (L14, Mg, Cr)

572-L. (Book.) **ASTM Standards on Paint, Varnish, Lacquer, and Related Products.** 848 p. 1955. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

A collection of all the ASTM specifications, methods of test, and definitions pertaining to paint, varnish, lacquer, and related products. Pertinent parts are individually abstract- (L14, Mg, Cr)

573-L. (Book.) **Institute of Metal Finishing, Transactions,** (Annual Volume), v. 31, 1954, 554 p. Institute of Metal Finishing, 32 Great Ormond St., London, W.C. 1, England, £3.10.0

Thirty-two papers delivered at the Fourth International Conference on Electrodeposition and Metal Finishing, London, Apr. 21-24, 1954. (L general)

574-L. Distribution of Crystals in Titania Enamels Fired Directly on Steel. E. D. Lynch and A. L. Friedberg. *American Ceramic Society, Journal,* v. 38, Aug. 1955, p. 257-263.

Technique for studying relation of the crystalline nature of the enamel to the bond developed on fired enamel specimens. Tables, graphs, micrographs, photographs. 11 ref. (L27, ST)

575-L. Protective Linings for Corrosive Materials. J. Melbourn. *Canadian Chemical Processing,* v. 39, July 1955, p. 34, 36.

Properties of various chemical-resistant coatings for steel containers. Photographs. (L26, ST)

576-L. Hot Dip Aluminium Coating for Cast Iron. Shigetomo Ueda. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 38-41.

Application methods, coating properties. Diagram, tables, graphs, micrograph. 2 ref. (L16, Al, CI)

577-L. The Ternstedt-Spray Process. Howard E. Smith. *General Motors Engineering Journal,* v. 2, July-Aug. 1955, p. 23-25.

Fundamentals, uses and advantages of an electrostatic painting process for applying decorative and protective coatings. Diagram, photographs. (L26)

578-L. Electrochemical Principles of Metallic Coatings. III. Corrosion at Pores and Discontinuity in Metallic Coatings. L. L. Shreir. *Industrial Finishing (London),* v. 8, July 1955, p. 389-392, 394, 400.

Factors controlling corrosion at a pore in a coating; anodic and cathodic coatings; porosity tests. Micrographs, diagrams. 31 ref. (L general, R1, R11)

579-L. Prevention of Paint Failures. III. Faults Due to Flow, Tumbling, Roller, Silk Screen Application, etc. *Industrial Finishing (London),* v. 8, July 1955, p. 396-398, 400.

Disadvantages of the application methods, means by which troubles in their use may be averted. Photographs. (L26)

580-L. Zinc Coatings on Steel. R. W. Bailey. *Industrial Finishing (London),* v. 8, July 1955, p. 401 + 6 pages.

History and characteristics of varying types of zinc coatings, details of exposure test work on them. Micrographs, graphs, photographs, tables, diagrams. 8 ref. (L16, Zn)

581-L. How Zinc Coatings Slow Atmospheric Corrosion. O. B. Ellis. *Iron Age,* v. 176, Aug. 18, 1955, p. 79-81.

Long-term exposures of specimens reveal their behavior under different atmospheric conditions. Graphs, micrograph. (L16, R3, Zn, Fe)

582-L. New Instrument Controls Rinse Tank Flow Automatically. J. B. Mohler. *Iron Age,* v. 176, Aug. 18, 1955, p. 82-83.

Device controls flow according to total conductivity of the rinse. Diagram, photograph. (L17, S19)

583-L. Great Flexibility—a Feature of New Automatic Plater. Nathaniel Hall. *Metal Finishing,* v. 53, Aug. 1955, p. 45-48.

Description and operation of an automatic nickel and chromium plater for mass production. Photographs. (L17, Cr, Ni)

584-L. Electrodeposition of Nickel From Fluoborate Solutions. C. B. F. Young and William Strobach. *Metal Finishing,* v. 53, Aug. 1955, p. 53-58.

Equipment, baths, additives. Graphs, photograph. (To be continued.) (L17, Ni)

585-L. Electroless Nickel Deposition. Fred Pearlstein. *Metal Finishing,* v. 53, Aug. 1955, p. 59-61.

Efforts to produce a thin film of palladium on nonconductors, rendering the surface active for the reduction of nickel from the electroless nickel bath. Photographs, tables. (L14, Ni, Pd)

586-L. Protection of Magnesium-Base Alloys. W. F. Higgins. *Metal Industry,* v. 87, July 29, 1955, p. 87-89, 93.

Special problems regarding painting of magnesium alloy castings and a composite scheme which embraces suitable foundation treatments with adequate painting measures. Table. (L26, Mg)

587-L. Radar Parts Precious Metal Plated for Conductivity. Burt R. Servass. *Precision Metal Molding,* v. 13, Aug. 1955, p. 52-53, 80.

Job plating of small parts with silver and palladium. Photographs. (L17, Ag, Pd)

588-L. Metallized Plastic Films. Thomas Hammer. *Product Engineering,* v. 26, Aug. 1955, p. 182-185.

Types, properties and uses for plain or laminated films, with coatings from 2½ to 16 millionths thick. Table, diagram, photograph. (L25, Al, Ag, Au)

589-L. Aldip Coating Improves Valve Durability. R. F. Thomson, D. K. Hanink, E. B. Etchells and K. B. Valentine. *SAE Journal,* v. 63, Aug. 1955, p. 54-56.

Process for improving durability of engine intake and exhaust valves by use of a dip coating. Diagram, micrographs, graphs, photograph, table. (L16, Al)

590-L. (English.) **Surface Treatment of Core Metal Used for Oxide-Coated Cathode.** Junkichi Nakai and Shogo Nakamura. *Physical Society of Japan, Journal,* v. 10, no. 7, July 1955, p. 566-570.

Experiments showing effect of contaminated surface layers on activity of drawn nickel sleeves that have suffered severe mechanical processing and heat treatment. Diagrams, graphs, tables. 1 ref. (L14, Ni)

591-L. (French.) **Study of Electrolysis in Very Concentrated Solution. Example of Electrolytic Polishing. II. Proof of Existence of an Adsorbed Ion Layer on the Electrode Surface. III. Water Content During Electrolysis in Very Concentrated Solution. IV. Electric Output. V. Practical Applications.** Philippe Brouillet. *Métaux, Corrosion-Industries,* v. 30, no. 357, May 1955, p. 192-219; no. 358, June 1955, p. 243-257.

Different types of electrode and

anodic voltages in presence of perchlorate ions, phosphoric ions and fused salts; existence of an anhydrous zone around the anode and absorption of atmospheric water; yield of dissolution in relation to the Faraday law. Diagrams, tables, graphs, photographs, micrographs. 39 ref. (L13)

592-L. (French.) **Thin Coating Under Vacuum.** R. P. Henry. *Vide,* v. 10, no. 57, May-June 1955, p. 50-63.

Theoretical bases, methods, technique of coating and applications. Table, graphs, diagrams, photographs. (L25)

593-L. (German.) **Hard Anodizing.** L. Bosdorf and A. Beyer. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 321-327.

Eloxal anodizing process, by Alcoa, which permits new fields of application for aluminum. Table, graphs, diagrams, photographs, micrographs. 15 ref. (L19, Al)

594-L. (German.) **On the Cooling of Pot-Galvanized Ware.** H. Bablik, F. Götzl and E. Nell. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 643-645.

Effects of different methods and rates of cooling on the surface structure and zinc-iron boundary zone. Graphs, micrographs, diagrams, table. (L16, Zn)

595-L. (German.) **Metallic Zinc as Protection Against Corrosion.** R. Haarmann. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 646-648.

Explains hydrogen and oxygen types of corrosion and the protection of iron against corrosion by galvanizing, electrolytic zinc plating, zinc spraying, diffusion of zinc into the iron surface, application of paints or pastes with pigment of metallic zinc dust and cathodic protection with zinc. Tables. 14 ref. (L15, L16, L17, L26, R10, Zn)

596-L. (German.) **Structure and Thermal Treatment of Zinc Coatings.** W. Ktaz. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 652-655.

Effect of structure of zinc deposit on the corrosion of zinc and zinc-coated iron; structure of the heat treated and non-heat treated hot-dip zinc coatings; effect of second heat treatment; measurement of the zinc layer thickness. Tables, micrographs. 5 ref. (L16, Zn)

597-L. (German.) **Zinc Dust as a Protection Against Corrosion.** *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 673-674.

Advantages of paints composed of pulverized zinc, zinc white and solvent. 2 ref. (L26, Zn)

598-L. (German.) **Developments in the Field of Chemical Polishing of Aluminum.** R. Lattey and H. Neunzig. *Metalloberfläche,* Ausgabe A, v. 9, no. 7, July 1955, p. 97-103.

Theory of chemical polishing, "Alupol" and "Erftwerk" polishing methods, optimum conditions, advantages. Tables, graphs, micrographs. 11 ref. (L12, Al)

599-L. (German.) **The Wash-Primer for Preconditioning Metals and Universal Prime-Coating.** H. F. Sarx. *Werkstoffe und Korrosion,* v. 6, no. 7, July 1955, p. 331-334.

Composition, function and directions for use of a two-component wash primer. (L26)

600-L. (German.) **Corrosion Resistant Coatings of Thin Sheet Metal on Steel and Concrete.** P. Voigt. *Werkstoffe und Korrosion,* v. 6, no. 7, July 1955, p. 337-343.

Cladding of equipment, vats and tanks made of concrete, steel or masonry by welding on "shingles" of stainless or other high-alloy steel. Diagrams, photographs. (L22, L24, SS)

601-L. (Russian.) **Combination of Methods for Increasing Corrosion Fatigue Resistance of Steel.** A. V. Riabchenkov and V. F. Abramova. *Vestnik Mashinostroeniia,* v. 35, no. 7, July 1955, p. 54-57.

Investigation of surface hardening followed by electrolytic chromium or zinc coating, surface hardening in combination with cathodic protection. Tables, graphs, diagram, photograph. 9 ref. (L17, R10, R1, ST)

602-L. (Russian.) **Chromium Plating of Compression Piston Rings of Magnesium Cast Iron.** N. A. Solov'ev. *Vestnik Mashinostroeniia,* v. 35, no. 7, July 1955, p. 75-77.

Standard requirements for rings, composition of electrolyte, control of operation, possible defects, their prevention and correction. Diagrams, micrograph. 5 ref. (L17, CI, Cr)

603-L. **Estimation of the Thermal Expansion of Enamels and Enamel Frits by the Stress-Optical Test.** H. J. van Buren. *American Ceramic Society Bulletin,* v. 34, Aug. 1955, p. 261-263.

Expansion of a porcelain enamel glass determined by optically determining the stress in a standard glass which was fused to an enamel glass. Methods of preparing samples; optically measuring stress by the use of polarized light; calculat-

ing coefficients of expansion. Photograph, diagrams. (L27)

604-L. Selection of Paints and Application in Combating Atmospheric Corrosion. F. T. Radecke. *American Petroleum Institute, Proceedings,* sec. III. *Refining,* v. 34, 1954, p. 37-47; disc., p. 47-49.

Coatings and basic coating practices for petroleum refineries. Tables, photographs. (L26, R3)

605-L. Radiant Panels for Tin Reflow. G. J. Campbell. *American Society of Mechanical Engineers, Paper No.* 55—S-22, 1955, 8 p. + 3 plates.

Development of radiant gas-fired panels for fusing electrolytically deposited tin on strip. Photographs, diagrams. (L17, Sn)

606-L. Welding Variables and Hardfacing Deposits. I. A. Zvanut and V. Peters. *Canadian Metals,* v. 18, Aug. 1955, p. 56, 58.

Electrode types, analysis of deposits, base metal dilution. Tables. (To be continued.) (L24)

607-L. Electroplating in Western Germany. II. Electroplating, Electropolishing and Chemical Polishing Plant, Processes and Solutions. R. Pinner. *Electroplating and Metal Finishing,* v. 8, Aug. 1955, p. 277-283, 286.

Materials, equipment and procedures for chromium, copper, nickel and silver plating. Polishing of stainless steel, and copper and lead aluminum alloys. Photographs. 6 ref. (L17, L12, L13, Cr, Cu, Ni, Ag, SS, Al)

608-L. P.V.C. and Fibre Glass Processing Tanks in the Electroplating Industry. E. Martin. *Electroplating and Metal Finishing,* v. 8, Aug. 1955, p. 284-286.

Properties and manufacture of polyvinyl chloride. Examples of plastic plating tanks. Photographs. (L17)

609-L. Low Temperature Ceramic Coatings for Light Gauge Metal. *Finish,* v. 12, Sept. 1955, p. 36-39, 93-94.

Sheets up to 48 by 120 in. in size are pickled, coated with frit and fired at 950 to 1000° F. for use as chalk boards. Table, photographs, diagram. (L27, Al, ST)

610-L. Metal Coatings. Donald Price. *Industrial and Engineering Chemistry,* v. 47, Aug. 1955, p. 1511-1513.

Two ways in which molybdenum is utilized in the formation of protective or decorative coatings. Photographs. 18 ref. (L17, L14, Mo, Zn)

611-L. Magnesium Protection Methods for Missiles. Forrest Warren. *Light Metal Age,* v. 13, Aug. 1955, p. 14-15.

Use of organic coatings to protect Navy guided missiles from salt water and other forms of corrosion. Photographs. (L26, R4, Mg)

612-L. Aluminum Coating Processes. Arthur Q. Smith. *Light Metal Age,* v. 13, Aug. 1955, p. 16-18.

Two processes to achieve corrosion resistance through aluminum bonding and aluminum surface coating. Photographs. (L22, L24, Al)

613-L. New Protective Coating for Magnesium Alloys. *Light Metal Age,* v. 13, Aug. 1955, p. 22-23.

An alkaline chromate process for coating magnesium alloys offers possibility of high-level protection at less cost. Micrographs. (L14, Mg)

614-L. Araldite Coatings for Aluminium Containers. P. A. Dunn. *Light Metals,* v. 18, Aug. 1955, p. 258-261.

Use of flexible lacquer for coating inside of aluminum containers and collapsible tubes. Photographs, tables. (L26, Al)

615-L. Modern Concepts in the Protection of Magnesium Base Alloys. W. F. Higgins. *Light Metals,* v. 18, Aug. 1955, p. 264-267.

Problems encountered when painting magnesium and a few simple principles that can be applied to overcome most of the difficulties. (L26, Mg)

616-L. Plating Metal Powder Compacts. Charles C. Cohn. *Metal Industry,* v. 87, Aug. 12, 1955, p. 128-129, 134.

Factors which hinder the successful electrodeposition of coatings on metal powder compacts. Basic requirements for successful reduction of surface porosity; suitability of various protective coatings. (L17, L19, H general)

617-L. Improved Method for Applying Cermets. *National Bureau of Standards, Technical News Bulletin,* v. 39, Aug. 1955, p. 112-114.

Application by spraying a water suspension instead of the usual flame-spraying technique. Photographs, micrographs, table. (L27)

618-L. Epoxy Coatings Protect Copper and Brass. E. H. Christ. *Organic Finishing,* v. 16, Aug. 1955, p. 13-15.

Carefully buffed, cleaned, coated and baked products withstand a 2-

min. concentrated nitric acid test. Photographs. (L26, Cu)

619-L. Precision Finishing in a Barrel. *Precision Metal Molding,* v. 13, Sept. 1955, p. 70-73, 92.

Processes involved in tumbling, parts that can be finished, types of finish, saving in costs, planning of the operation. Diagram, photographs. (L10)

620-L. Degreasing Systems and Their Choice. D. J. Fishlock. *Product Finishing,* v. 8, Aug. 1955, p. 48-56.

Methods available for degreasing the most commonly encountered metals reviewed, with particular emphasis upon the correct choice of degreasing method. Tables, photographs, graph, diagram. (To be continued.) (L12)

621-L. Electrodeposition of Heavy Nickel. II. D. J. Fishlock. *Product Finishing,* v. 8, July 1955, p. 66-74.

Solution control, anode types, bath compositions, production details. Graph, photographs, table, diagram. 7 ref. (L17, Ni)

622-L. Anodising Aluminium Chair Parts. *Product Finishing,* v. 8, Aug. 1955, p. 74-77.

Plant layout and process details. Advantages of the installation. Photographs, diagram. (L19, Al)

623-L. A Survey of the Literature on the Electrodeposition of Molybdenum. T. T. Campbell and A. Jones. *U. S. Bureau of Mines, Information Circular* 7723, July 1955, 6 p.

Deposition from aqueous and nonaqueous mediums; fused salt electrolysis. (L17, Mo)

624-L. (German.) **Effect of Mercury-Vapor Residues on the Diffusion of Silver in Thin Films of Tellurium or Selenium.** U. Zorll. *Annalen der Physik,* v. 16, nos. 1-2, 1955, p. 27-30.

Electron-refraction studies reveal that residual mercury reacts with tellurium or selenium during the process of vapor deposition. Possible methods of avoiding the distributing effect of such vapors. Diagrams. 6 ref. (L25, N1, Ag, Se, Te)

625-L. (German.) **The Properties of Activated Carbon.** G. Brinkmann. *Metalloberfläche,* Ausgabe A, v. 9, no. 8, Aug. 1955, p. 113-117.

Relationship between adsorption, chemisorption and porosity; effect of surface structure of activated carbon in aqueous solutions and dispersions; mechanism of carbon catalysis and use of activated carbon in electroplating. 16 ref. (L17, S19, C)

626-L. (German.) **Galvanic Coatings of Tin-Zinc Alloys.** J. W. Cuthbertson. *Metalloberfläche,* Ausgabe B, v. 9, no. 8, Aug. 1955, p. 113-116.

Conditions and procedure of electroplating metals with tin-zinc alloy; properties of the deposit; uses of the plated articles and parts. Graphs, photograph. (L17, Sn, Zn)

627-L. (German.) **Preliminary Surface Treatment and Lacquering of Sheet Metal in the Industrial Processing of Sheet Metal.** H. Anders. *Metalloberfläche,* Ausgabe B, v. 9, no. 8, Aug. 1955, p. 116-118.

Methods of cleaning sheet-metal surfaces by mechanical and chemical means and of applying protective lacquer coatings before shaping the sheet metal into containers. 6 ref. (L10, L12, L26)

628-L. (German and French.) **Modern Technique of Metal Spraying.** W. Baiker. *Zeitschrift für Schweisstechnik,* v. 45, no. 8, Aug. 1955, p. 163-173.

Spraying equipment; structures and properties of sprayed coatings. Industrial uses of metal spraying, including building-up of worn parts; manufacture of parts, molds and dies; coating of insulators with conducting metals. Diagrams, tables, photographs. (L23)

629-L. Electrolytic Oxidation of Zinc in Alkaline Solutions. Thedford P. Dirkse. *Electrochemical Society, Journal,* v. 102, Sept. 1955, p. 497-501.

Clarification of the reaction mechanism occurring during the discharge of alkaline batteries having zinc negative plates. It may also be the anodic reaction in alkaline zinc plating baths. Graphs. 4 ref. (L17, R1, Zn)

630-L. Anodic Polarization of Zirconium at Low Potentials. George B. Adams, Jr., Pierre Van Rysselberghe and Mario Maraghini. *Electrochemical Society, Journal,* v. 102, Sept. 1955, p. 502-511.

Methods for quantitative studies of the growth of very thin oxide films on zirconium and for estimating the film thickness as this growth progresses. Tables, graphs. 9 ref. (L19, Zr)

631-L. In-Plant Plating Moves Diversified Product Line Faster. W. G. Patton. *Iron Age,* v. 176, Sept. 1, 1955, p. 91-93.

A highly versatile zinc barrel plating system, suitable for some 1500 to 2000 different fittings, results in lower plating costs, reduced inventory and improved customer service. Photographs. (L17, Zn)

632-L. Rinse Tank Control. J. B. Mohler. *Metal Finishing,* v. 53, Sept. 1955, p. 66-68.
Efficiency of this phase is vital in face of current water costs and pollution problems. Graphs. 4 ref. (L17, L12)

633-L. Surface Treatment and Finishing of Light Metals. VII. Industrial Anodizing of Aluminum and Its Alloys. S. Wernick and R. Pinner. *Metal Finishing,* v. 53, Sept. 1955, p. 69-75.
Effects of alloying elements are usually undesirable. Anodizing equipment and processes. Table, graphs, photographs. 25 ref. (To be continued.) (L19, Al)

634-L. Methods of Coating Plastics With Metal. John Keating. *Metal Finishing,* v. 53, Sept. 1955, p. 76-78, 85.
Preparation and precautions for coating process and electroplating baths. (L23, L17, Ag, Cu)

635-L. Electrodeposition of Nickel From Fluoborate Solutions. III. C. B. F. Young and William Strobach. *Metal Finishing,* v. 53, Sept. 1955, p. 79-85.
Process is economically justified because it plates three times as fast with greater efficiency. Graph. (L17, Ni)

636-L. So—You're Going to Overhaul Your Turbine Generator! VI. Metallizing Turbine Shaft. *Power Engineering,* v. 59, Sept. 1955, p. 65-69.
Method of applying a hard layer of stainless steel, in form of continuous metal spray, on a turbine shaft. (L23, SS)

637-L. Alloy Plating. Robert T. Gore. *Product Engineering,* v. 26, Sept. 1955, p. 136-139.
Evaluation of available alloys and plating methods, properties, advantages and limitations and basic plating procedure for brass, some tin, nickel and silver alloys, and other compositions, some still in development. Discusses the copper-tin (bronze) alloy, a corrosion-resistant undercoating with better throwing power and higher rates of deposition than copper. Properties of the deposits, applications, and plating procedure. Photographs. (L17, Ag, Cu, Ni, Sn)

638-L. Automatic Polishing Speeds Production of Aluminum Trim Shapes. Paul C. Barber. *Products Finishing,* v. 19, Sept. 1955, p. 26-29.
Use of an automatic buffing machine to finish extruded aluminum parts. Application of bright anodizing to provide a more wear resistant surface. Photographs. (L10, L19, Al)

639-L. Recently Developed Anodize Coatings for Magnesium. Peter Zylstra. *Products Finishing,* v. 19, Sept. 1955, p. 30 + 5 pages.
Review of known facts about these anodize coatings and their uses. (L19, Mg)

640-L. Hot Dip Aluminum Coating Iron and Steel Wire. Bernard S. Westerman. *Products Finishing,* v. 19, Sept. 1955, p. 62 + 5 pages.
Characteristics of hot dipped aluminum coatings applied to wire offer substantial and significant advantages in extension of service life, corrosion and oxidation resistance. Diagram. (L16, Al, Fe, ST)

641-L. Finishing Systems for Aluminum Evaporators. R. V. Vanden Berg. *Refrigerating Engineering,* v. 63, Aug. 1955, p. 37 + 5 pages.
Anodizing methods and equipment, oxide coating properties. Micrographs, photographs, graphs. (L19, Al)

642-L. Abrasive Belt Polishing. II. Lee Vorce. *Steel,* v. 137, Sept. 12, 1955, p. 102-104.
Line and station concept automates belt finishing. Photograph. (To be continued.) (L10)

643-L. (Pamphlet.) **Research on Materials and Surface Coatings for Aircraft-Arresting Wire Rope and Hook Points.** R. J. MacDonald, J. K. Thompson, and G. K. Manning. Final Report. PB 117567. 18 p. 1954. Library of Congress, Washington, D. C. Mimeograph $2.00. Photograph $2.75.
The following were tested: Colmonoy coating, flame-plated tungsten carbide, molybdenum disulfide, vapor and spray deposited tungsten and molybdenum, Elgiloy, and fiberglass combinations. (L general)

644-L. (Book.) **Steel Structures Painting Manual. Systems and Specifications.** Joseph Bigos, ed. v. II. 292 p. 1955. Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh 13, Pa.
Supplements volume one (which established general good practices) with specific recommendations for various types of steel structures. Contains specifications for surface preparation, pretreatment, application, paint systems, and specific paints. (L26, ST)

645-L. (English.) **Some Recent Research Results of the A.B.E.M. Cor-**

rosion Committee. M. Van Rysselberge and D. Bermane. *Acier, Stahl, Steel,* v. 20, no. 7-8, July-Aug. 1955, p. 317-320.

Provisional tests indicate that with improved vehicles on a synthetic resin basis and multiple pigments including zinc chromate, white lead, or, for particular uses, zinc dust, will enable paints to be produced having a protective quality at least equal, if not greatly superior, to the traditional paint compounds based on linseed oil and red lead. Tables, graphs. 16 ref. (L26, ST)

646-L. **Aspects of Electrolytic Polishing.** Cornelius A. Johnson, *AB Metal Digest,* v. 1, Sept. 1955, p. 3 + 4 pages.

Considers mechanism, qualities of bath, factors directly influencing results, preparation of several different samples. Graphs, diagrams. (L13)

647-L. **World's Largest Plating Facility Is Fully Automatic.** Thomas Mac New. *Automotive Industries,* v. 113, Sept. 15, 1955, p. 56-59, 118.

Set-up and operation of facilities for mass plating of vehicle bumpers. Photographs. (L17, Cr)

648-L. **Corrosion Protection by Rubber. Acid and Alkali Resistant Protective Paints. I. Chlorinated Rubber Paints.** W. L. Leo. *Corrosion Prevention and Control,* v. 2, Aug. 1955, p. 25-27, 50.

Presents a grouping of the various classes of corrosion conditions normally encountered and form of service required to be given by the protective coatings usually employed. (L26, R general)

649-L. **Protection of Metals With Hypalon.** H. J. Lanning. *Corrosion Prevention and Control,* v. 2, Aug. 1955, p. 30-32.

Properties of the material, its advantages and applications. Table. (L26)

650-L. **Paint Faults and Remedies. XIII. Peeling.** H. Courtney Bryson. *Corrosion Prevention and Control,* v. 2, Aug. 1955, p. 43-46.

Cause of peeling on various surfaces and methods of preventing the occurrence. (L26)

651-L. **It's Easy to Remove Weld Discoloration From Stainless Steel.** W. E. McFee. *Finish,* v. 12, Oct. 1955, p. 29, 46.

Alternating current electrolytic process is used. Photograph. (L13, K general, SS)

652-L. **Planishing Improves Weld Seam Quality.** Gilbert C. Close. *Finish,* v. 12, Oct. 1955, p. 40-41, 104.

Seam is fed between pair of pressure rolls and enough force is applied to crush weld metal flush with parent surface. Photographs. (L10, K3)

653-L. **Plastisols: Versatile, Low-Cost Protective Coatings.** D. R. Meserve. *Iron Age,* v. 176, Sept. 8, 1955, p. 77-79.

Various forms of plastisols can be compounded to varying degrees of hardness or to resist particular corrosive conditions. In colored form they improve product appearance. Photographs. (L26)

654-L. **Pre-Finished Metals Combine Attractiveness With Savings.** J. B. Mohler. *Iron Age,* v. 176, Sept. 22, 1955, p. 107-109.

Precoating can be combined with mechanical prefinishing of sheet and strip materials. Properties and uses of the ready-to-use sheet and strip materials summarized and discussed. Photographs, tables. (L general)

655-L. **Complex Transmission Castings Cleaned, Descaled Electrolytically.** J. Birnbaum. *Iron Age,* v. 176, Sept. 22, 1955, p. 116-118.

Automatic conveyorized unit cleans a work fixture of cast parts every 1 to 2 min. Subsequent machining is made easier. Photographs. (L13, G17, CI)

656-L. **Crack-Free Chromium.** *Metal Industry,* v. 87, Sept. 9, 1955, p. 223-234.

Coating deposited directly on steel has low coefficient of friction, excellent adhesion, nongalling surface, superior ductility and attractive light grey matte surface that can be buffed to high luster. Micrographs. (L17, Cr, ST)

657-L. **Factors Influencing the Unrubbed Glossiness of Metal Lacquers.** G. N. Bruxelles and B. H. Mahlman. *Paint and Varnish Production,* v. 45, Sept. 1955, p. 23-32.

Effects of evaporation rate and composition of solvent blend, application technique, roughness of substrate material and of primer film surface, and swelling action of lacquer solvent on primer on the glossiness of a single nitrocellulose lacquer solids composition applied by automatic spray equipment. Tables, photographs. 1 ref. (L26)

658-L. **Abrasive Belt Polishing.** Lee Vorce. *Steel,* v. 137, Sept. 5, 1955, p. 86-89; Sept. 19, 1955, p. 132-134.

Advantages over abrasive wheels

and utilization of various types of belts and contact wheels. Considers part shape, material, finish and production required. Table, photographs, diagrams. (L10)

659-L. A Modern Pickling and Surface Treatment Shop for Nickel Alloys and Stainless Steels. Marcel Perret. *Wire and Wire Products,* v. 30, Sept. 1955, p. 1003-1009, 1063-1065.

Equipment and procedures for processing nickel alloys, stainless and heat resisting steels in wire, strip, tubes and bars at a new French plant. Photographs, diagrams. (L12, Ni, SS)

660-L. Adhesion of Electrolytic Zinc Deposits to Iron. K. M. Gorbunova and P. D. Dankov. *Henry Brutcher Translation No.* 3549, 8 p. (Abridged from *Zhurnal Fizicheskoi Khimii,* v. 27, no. 11, 1953, p. 1725-1730.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 363-L, 1954. (L17, Fe, Zn)

661-L. Acidless Chemical Process for Descaling of Stainless and Heat-Resisting Steels. B. Wenderott. *Henry Brutcher Translation No.* 3553, 11 p. (Condensed from *Stahl und Eisen,* v. 75, no. 3, 1955, p. 141-144.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 235-L, 1955. (L12, SS, AY)

662-L. Structure of Layers Produced by Electrospark Hard Facing (of Tool Steels) With Different Cemented Carbides. E. Bryjak and W. Missol. *Henry Brutcher Translation No.* 3569, 16 p. (Abridged from *Hutnik,* v. 22, no. 3, 1955, p. 77-86.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 440-L, 1955. (L general, M27, M28, C-n)

663-L. (Czech.) **New Information on the Surface Treatment of Tools.** St. Blazek. *Strojirenstvi,* v. 5, no. 5, May 1955, p. 362-366.

Experiments with AP 1005 surface treatment; theory of the process and metallographic analysis; effect of heat treatment on the final results; service life increased by phosphatization. Micrographs. 15 ref. (L14, ST)

664-L. (French.) **Cleaning by Ionic Attack for Metallographic Observations With the Photo-Emission Electron Microscope.** E. Louis Huguenin and Maurice Gauzit. *Comptes rendus,* v. 241, no. 4, July 25, 1955, p. 378-380.

Use of an ion gun, a discharge tube and pulverization in the discharge tube, followed by bombardment with the gun, for cleaning. Diagram, micrographs. 2 ref. (L13, M21)

665-L. (German.) **New Method of Polishing Aluminum.** W. Burkart. *Aluminium,* v. 31, no. 9, Sept. 1955, p. 436-442.

Polishing rings used in conjunction with an emulsion sprayed onto surface of disk. To provide better matching of polisher speed to diameter of polishing wheels, machines are available in which speed is infinitely variable. Photographs, diagrams. (L10, Al)

666-L. (German.) **Mechanical Descaling of Wire Rod by Bending.** Clemens Eisenhuth. *Stahl und Eisen,* v. 75, no. 17, Aug. 25, 1955, p. 1092-1099.

Physical prerequisites for the removal of the scale; weight losses in mechanical descaling; relations between surface and drawing solid lubricants; back pull caused in mechanical descaling by bending. Table, graphs, photographs. (L10, ST)

667-L. (Russian.) **Lac-Dye Materials for the Anticorrosion Protection of Equipment and Metallic Structures Used in Manufacturing Sulfuric Acid and Superphosphates.** A. I. Reibman and M. I. Finkel'shtein. *Khimicheskaia promyshlennost',* 1955, no. 3, Apr.-May, p. 150-152.

Use of protective layers and combinations, under various operating conditions, including copolymers of chlorvinyl with vinylidene chloride, perchlorvinyl resin and chlorinated rubber, bakelite, enamel, varnishes and lacquers. (L26)

668-L. (Russian.) **Periodic Phenomena in the Electrolytic Deposition of Cadmium in the Presence of Alcohols.** D. N. Gritsan, D. S. Shun and B. M. Bulgakov. *Zhurnal fizicheskoi khimii,* v. 29, no. 6, June 1955, p. 953-958.

Periodic fluctuations of cathode potential during deposition of cadmium from solutions of cadmium sulfate; effect of alcohol concentration and current density. Oscillograms, table, circuit diagram, 9 ref. (L17, Cd)

669-L. (Russian.) **Causes for the Formation of Sponge on the Cathode During Zinc-Plating From Acid Solutions in the Presence of Salts of Electropositive Metals.** N. T. Kudriavtsev and A. G. Atanasiants. *Zhurnal fizicheskoi khimii,* v. 29, no. 7, July 1955, p. 1227-1235.

Influence of metal salts, more electropositive than zinc, on the na-

ture of its surface change and on the electrode potentials during electrolysis and in the presence of current in zinc electrolytes. Formation on zinc in the presence of copper, antimony and arsenic salts, with and without current flow. Graphs, table. 9 ref. (L17, Zn)

670-L. Hydrogen Contamination in Descaling and Acid Pickling of Titanium. G. A. Lenning, C. M. Craighead and R. I. Jaffee. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 33, 1955, 10 p.

Significant hydrogen absorption in titanium can occur in a sodium hydride descaling bath and in a 10% nitric, 2% hydrofluoric acid pickle. The amount of hydrogen absorbed increased with increasing ratio of surface area to mass and also with time in the baths. There was a minimum at about 800° F. in the hydrogen pickup from the sodium hydride descaling bath. Tables. 4 ref. (L12, Ti)

671-L. What You Should Know About Clad Steels. Henry F. Peters. *Chemical Engineering,* v. 62, Oct. 1955, p. 234 + 4 p.

Properly selected cladding material will prevent or reduce corrosion, abrasion or oxidation, prevent contamination of substance in contact with metal and supply desired properties such as high strength and good electrical conductivity. Photographs, table, diagrams. (L22, R general, Q23, P15, ST, SS, Ni)

672-L. Electron Microscope Studies on Copper Deposits From Sulfate and Cyanide Baths. Shinzo Okada and Saburo Magari. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 580-585.

At low current densities, deposits on different cathodes are not uniform. Micrographs, reflection patterns, tables, diagrams, 6 ref. (L17, M27, Cu)

673-L. Bright Nickel Plating Solutions. T. E. Such. *Electroplating and Metal Finishing,* v. 8, Sept. 1955, p. 308-315.

Different types of fully bright and semibright solutions, relative advantages and disadvantages in relation to brightness, levelling, ductility and residual stress. Tables, graphs. (To be continued.) (L17, Ni)

674-L. High Efficiency Gas Heated Plant in Metal Finishing. A. E. Tyrrell. *Electroplating and Metal Finishing,* v. 8, Sept. 1955, p. 316-318.

Efficiency increased by insulating tank, covering solution with floating plastic tubes and immersing tubes. Photographs, tables, diagram. (L general)

675-L. Metal Spraying and Its Applications. W. E. Ballard. *Industrial Finishing, (London),* v. 9, Aug. 1955, p. 26-28.

History up to latest automatic methods. Micrograph, photographs. (L23)

676-L. Prevention of Paint Failures. IV. Faults Due to Application and Misuse of Materials. *Industrial Finishing (London),* v. 9, Aug. 1955, p. 32, 34-36.

Deals with effective storage, thinning of paint, pretreatment and organization of workshop. Photographs. (L26)

677-L. Modern Ferrous and Non-Ferrous Pickling Speeded With Cast Corrosion Resistant Alloys. *Industrial Heating,* v. 22, Sept. 1955, p.1796 + 6 pages.

Capable of being placed in a continuous production line, this pickling process was possible because of availability of stainless steel pumps, flanges and valves which can handle highly corrosive pickling solutions. Photographs. (L12, SS)

678-L. Cermet Powder Combined With Ceramic Frit Provides Coherent Protective Coatings. *Industrial Heating,* v. 22, Sept. 1955, p. 1869 + 4 pages.

Discussion of National Bureau of Standards' cermet coating, M-60, that protects metal parts against oxidation at high temperatures. Photographs. (L27, R2, Cr, B, Ni)

679-L. Maintenance Painting in the Steel Industry. Cecil Schofield. *Iron and Steel Engineer,* v. 32, Sept. 1955, p. 65-73; disc., p. 73-74.

Performance specification of paint is preferred over formula specification because development of better paints is not handicapped and responsibility is on the paint supplier. Photograph. (L26, ST)

680-L. Use of Heavy Cutback Asphaltum Mastic Coatings in Coke Plant Areas. Abner H. Bagenstose, Jr. *Iron and Steel Engineer,* v. 32, Sept. 1955, p. 75-78; disc., p. 78-80.

Because mastics can supplement paint to protect materials in bad corrosive areas, this article considers materials selection, surface preparation and application. Photographs. (L26, ST)

681-L. Absorption of Strontium and of Barium on Tungsten. George E. Moore and H. W. Allison. *Journal of Chemical Physics,* v. 23, Sept. 1955, p. 1609-1621.

Deposits on ribbon receivers by evaporation from source filaments could be cleaned by heating to high temperature; thus repeated tests were possible. Diagrams, graphs, tables. 41 ref. (L25, Sr, Ba, W)

682-L. A New Look at Electroformed Parts. H. D. Rice. *Materials & Methods,* v. 42, Sept. 1955, p. 99-101.
Used where exceptional surface finish or detail, high precision and complex internal design are required. Photographs, micrograph, table. (L18)

683-L. Tin-Nickel Alloy Plated Coatings. Robert T. Gore. *Materials & Methods,* v. 42, Oct. 1955, p. 102-105.
Appearance of consumer products and corrosion resistance of industrial parts are improved. Photographs, graph, tables. (L17, Ni, Sn)

684-L. —— Finishes for Metal Products. *Materials & Methods,* v. 42, Sept. 1955, p. 117-132.
Outlines major types of permanent finishes, including conversion, organic, metallic and inorganic coatings. Photographs. (L general)

685-L. Developments in Bi-Metallic Construction. *Mechanical World and Engineering Record,* v. 135, Sept. 1955, p. 414-415.
Intermolecular bonding (by tinning and casting process) of aluminum to steel and titanium permits adjustment of strength-weight ratio, cost, wear, and corrosion-resistant properties of vital machine parts. Diagrams, graph, photograph. 1 ref. (L22, Al, ST, Ti)

686-L. Progress in Metal Cleaning and Finishing. Abner Brenner. *Metal Progress,* v. 68, Sept. 1955, p. 113-117, 192, 194.
Electroplating of elements from aqueous solutions has about reached its limit; future developments will include wider use of alloy deposition and nonaqueous plating solutions. Photographs. (L general)

687-L. The Selection of Electroplated Coatings. *Metal Progress,* v. 68, Aug. 15, 1955, p. 97-105.
Topics such as influence of shape and galvanic corrosion in plating for protection, decoration or special purposes. Tables, graphs, photograph. (L17)

688-L. Metal Cleaning Costs. *Metal Progress,* v. 68, Aug. 15, 1955, p. 169-173.
Labor (direct and indirect), materials, power and equipment evaluated. Tables. (L10, L12, A4)

689-L. Recent Developments in Antifouling Paints. Allen L. Alexander. *Organic Finishing,* v. 16, Sept. 1955, p. 5-10, 12.
Exemplified by newer vinyl systems, these adaptable coatings with cathodic protection combat ship hull corrosion. Table, photographs, graphs. 4 ref. (L26, R10)

690-L. The Anodic Etch in Preparation for Plating. F. G. Brune and V. L. McEnally, Jr. *Plating,* v. 42, Sept. 1955, p. 1127-1132.
Sulfuric acid-epsom salt solution is used to prepare ferrous parts for good adhesion with nickel coat and other plating. Micrographs, tables, phase diagrams, photograph. 30 ref. (L19, L17)

691-L. Lead-Tin-Antimony Plating. Reginald T. Putnam and Elijah J. Roser. *Plating,* v. 42, Sept. 1955, p. 1133-1136.
Describes control precedures and solution developed to plate a lead base alloy containing 11% tin and 7% antimony; effect of variations of plating conditions and solution composition. Graphs, diagram, photograph, table. (L17, Pb, Sn, Sb)

692-L. Metal Cleaning Studies Using Radioactive Tagged Soils. James W. Hensley and Russell D. Ring. *Plating,* v. 42, Sept. 1955, p. 1137-1143.
Some effects of electrocleaning variables are peculiar to fatty acid soil. Concentration and current density variations are different with tagged mineral oil soil. Photographs, graphs, diagram. 6 ref. (L general, S19)

693-L. Plating of Beryllium Copper. Simon J. Morana. *Plating,* v. 42, Sept. 1955, p. 1144-1148.
Since these alloys can be hardened by a simple heat treating operation, from a soft, workable state to levels of strength and hardness beyond those of other copper-base alloys, they are used extensively in automotive and electrical industries. Photographs. (L17, Cu)

694-L. Electrotinning of Copper Wire From the Stannous Fluoborate Bath. A. E. Carlson. *Plating,* v. 42, Sept. 1955, p. 1149-1150.
Because of the stability, high-speed characteristics, and simplicity of operation, other fluoborates are finding use in the wire industry. Photograph, table, micrograph. (L17, Sn, Cu)

695-L. Filtering of Chromic Acid Solutions. R. F. Ledford and Lloyd O. Gilbert. *Plating,* v. 42, Sept. 1955, p. 1151-1155.
Relative simplicity of chromic acid plating solution has detracted from

the importance of filtering. Discussed are operation and construction of filtration equipment as well as several applications. Photographs, graphs, diagram, table. 2 ref. (L17, Cr)

696-L. Degreasing Systems and Their Choice. D. J. Fishlock. *Product Finishing,* v. 8, Sept. 1955, p. 50-55.
Chemical (alkali) cleaning, electrocleaning methods, inspection and control. Diagram, photographs. (L12, L13)

697-L. Diffusion Coating With Metallic Halides. I. Theoretical Considerations. I. Jenkins. *Product Finishing,* v. 8, Sept. 1955, p. 61-67.
Newer processes of solid-gas diffusion coating reactions. Types of coatings, principles, halide chemistry, complex metal coatings, metallic carbonyls. Diagram, graphs, micrographs. (To be continued.) (L15)

698-L. Recent Developments in Stoving Phenolic Coatings. G. Barnett and K. D. Drakeley. *Product Finishing,* v. 8, Sept. 1955, p. 68-75.
Poor flexibility and alkali resistance of phenolic coatings improved by combining with polyamines or epoxides. Photographs, tables. (L26)

699-L. From Semi to Full Automatic Plating. Fred G. Brune. *Products Finishing,* v. 20, Oct. 1955, p. 44-54, 56.
Factors to be considered including space requirements, possible savings. Photographs, diagram, tables. (L17)

700-L. More Life for Plating. F. L. Scott. *Steel,* v. 137, Sept. 26, 1955, p. 116-117.
Because they stick tight and resist wear, organic coatings, applied over electroplated zinc and chromium, are effectively preventing corrosion. Photograph. (L26, Zn, Cr)

701-L. Protective Coatings for Corrosion Control. N. T. Shideler. *Virginia Polytechnic Institute, Bulletin, Engineering Experiment Station Series No.* 102, v. 48, no. 10, Aug. 1955, p. 20-32.
Surface preparation, application and properties of drying oil base, oleoresinous, synthetic and bituminous coatings. 6 ref. (L26)

702-L. A New Face Toughens Forge Dies. *Welding Engineer,* v. 40, Oct. 1955, p. 60-61.
Hard facing top and bottom of dies for 1000-ton press has increased normal service life from 4 to 18 times. (L24, F22, SS)

703-L. Surfacing With Composite Tube Rod. R. P. Culbertson. *Welding Journal,* v. 34, Sept. 1955, p. 861-869.
Preblended metal powders, in a continuously formed mild steel tube, are used for automatic hard facing and surfacing applications. Photographs, micrographs, tables. (L24, AY)

704-L. Finishing and Plating of Metal Powder Parts. Charles C. Cohn. *Proceedings,* Eleventh Annual Meeting of Metal Powder Association, v. I, p. 6-11; disc., p. 11-13.
Factors in making component, ideal conditions for filling pores, knowledge a plater should have, summary of factors to consider before plating, anodizing, oxidizing, phosphatizing, chromatizing and conversion coating. Micrographs. (L general, H general)

705-L. Hot and Cold Ductility of Calorized Coatings. S. G. Bogdanov. *Henry Brutcher Translation No.* 3530, 8 p. (Abridged from *Vestnik mashinostroeniya,* v. 32, no. 9, 1952, p. 48-54.) Henry Brutcher, Altadena, Calif.
Aluminum-impregnated steel surfaces, hot worked without scaling or other damage, show increased resistance to corrosion by water, air (ordinary and elevated temperatures) and performance under various conditions. Tables, diagram, micrographs, photographs. (L15, Q23, ST, Al)

706-L. (German.) **Corrosion Preventing Agent With a Limited Protective Action.** Wilfred Pohl. *Erdöl und Kohle,* v. 8, no. 8, Aug. 1955, p. 552-556.
Different corrosion preventing agents, mainly of a greasy constitution for application in storing, transportation and during production. Also gives suggestions for selection of various types of compounds. Table. (L26)

707-L. (German.) **The Importance of the Metallizing Technique for Maintenance Work in Iron and Steel Works.** Josef Wingerath and Friedrich Wilhelm. *Stahl und Eisen,* v. 75, no. 18, Sept. 8, 1955, p. 1189-1197.
Important fields of application to repair work and requirements to be met by sprayed metals with different forms and conditions of design. Diagrams, photographs. 6 ref. (L23, ST)

708-L. (Polish.) **Protective Coatings.** K. Körner *Technika lotnicza,* v. 10, no. 5, Sept.-Oct. 1955, p. 142-144.
Types of coatings and applications, especially for aircraft, anticorrosive-

ness and other characteristics. Table. 10 ref. (L general)

709-L. (Book.) **Finishing Handbook and Directory, 1955.** I. S. Hallows, editor. 5th Rev. Ed. 483 p. 1955. Sawell Publications, 4 Ludgate Circus, London E.C.4, England.

Sections cover preparatory treatments, types of paint and application methods, selection of painting schemes, electroplating processes, finishes for aluminum alloys, zinc and flock coating, metallizing nonmetallic surfaces, vacuum deposition, and plastics. (L general, Al, Zn)

710-L. (Book—German.) **Preliminary Treatment of Ferrous and Nonferrous Metal Surfaces. Oberflächenvorbehandlung von Eisen- und Nichteisenmetallen.** Willi Machu. 801 p. 1954. Akademische Verlagsgesellschaft Geest & Portig K.-G., Leipzig, Germany.

Methods of cleaning with inorganic and organic chemicals, greasing and degreasing, etching, and mechanical and electrical treatment. (L general)

711-L. How Far Will Your Paint Go? E. Gustave Shur. *Interchemical Review* v. 14, Autumn 1955, p. 79-85.

Determination of amount of paint needed to cover a given area. Considers losses and pigment-to-vehicle ratios. Tables, diagrams, photograph. (L26)

712-L. New Chrome Plating Process Deposits Highly Ductile Coatings.

P. J. Topelian. *Iron Age,* v. 176, Oct. 13, 1955, p. 99-101.

Heavy, dense hard-chromium deposits can be plated directly on aluminum by a new process which gives exceptional intermetallic bonding strength. Deposits can also be applied to carbide, titanium, cold rolled steel, zinc alloys, lead alloys, beryllium-copper and tungsten. Photographs. (L17, Q23, Cr)

713-L. Recent Anodizing Research. A. W. Brace. *Metal Industry,* v. 87, Sept. 23, 1955, p. 261-264.

Recent work on mechanism of coating formation and effects of various anodizing conditions. Graphs, table, micrographs, diagram. 7 ref. (L19, Al)

714-L. Electroplated Contacts. P. Quinn. *Metallurgia,* v. 52, no. 311, Sept. 1955, p. 115-120.

How best use can be made of an electroplating process to achieve the maximum efficiency in production and effectiveness in service. Tables. 6 ref. (L17, Cu, EG-c)

715-L. Protecting Molybdenum From Oxidation. Alvin J. Herzig and James R. Blanchard. *Metal Progress,* v. 68, Oct. 1955, p. 109-114.

Cladding, electroplating, metal spraying and ceramic coating offer promise for protecting molybdenum under various conditions and services. Photographs, tables. (L17, L23, L24, L27, Mo)

716-L. Airless Spray Painting. James A. Bede. *Plating,* v. 42, Oct. 1955, p. 1251-1254.

Requires heating paint and spraying it under pressure through suitable nozzle. Graphs, diagram. (L26)

717-L. Electrophoretic Deposition of Metallic and Composite Coatings. J. J. Shyne, H. N. Barr, W. D. Fletcher and H. G. Scheible. *Plating,* v. 42, Oct. 1955, p. 1255-1258.

Development of process for applying nickel, nickel-chromium, nickel-chromium-iron, copper-molybdenum disulfide, and nickel-silicon carbide to base metals. Techniques for bonding the coatings include deposition of a hydrogen reducible oxide, or electrolytic deposition of a metal through pores in the coating. Photographs, graph. 7 ref. (L17, Si, Cu, Mo, Fe, Cr, Ni)

718-L. Electroless Nickel Plating of Nonconductors. Philip H. Eisenberg and Harold C. Schneider. *Plating,* v. 42, Oct. 1955, p. 1268-1270.

Application to nonconductors of varied geometry; cleaning and etching cycles; plating solutions; plate adherence, deposition rates and solution control data; microscopic examination of plated objects. Photographs, graph. 5 ref. (L14, Ni)

719-L. Strippable Stop-Off Coatings. Myron C. Bryant. *Plating,* v. 42, Oct. 1955, p. 1273-1274.

Limitations of an improved technique for selective masking of metal surfaces prior to electroplating operations. Photographs. (L26, L17)

720-L. How to Strip Plated Die Castings. W. K. Murray. *Precision Metal Molding,* v. 13, Oct. 1955, p. 67-68, 82.

Practical method cuts down rejects by salvaging castings that have defective plating. Photograph. 2 ref. (L12, Pb, Cr, Ni, Cu, Zn)

721-L. Shiny Picture for Brass-Plated Strip. E. J. Roehl. *Steel,* v. 137, Oct. 17, 1955, p. 118-119.

Equipment and methods for plating steel strip. Embossed patterns and other finishes. Applications. Photographs, graph. (L17, Cu)

722-L. (German.) **"All-Purpose" Polishing Paste.** W. Burkart and G. Herbst. *Metalloberfläche,* Ausgabe B, v. 9, no. 9, Sept. 1955, p. 129-132.

Evaluates various alumina and alumina-base polishes; distinctive characteristics; possibilities. Micrographs, photograph. 1 ref. (L10, M21)

723-L. (German.) **Influence of Polishes on Corrosion Susceptibility of Metal Surfaces.** R. Weiner and G. Klein. *Metalloberfläche,* Ausgabe B, v. 9, no. 9, Sept. 1955, p. 132-134.

Data, compiled in tables, of different polishes and metals with respect to their influence on corrosion of the treated metal. Tables. (L10, R11)

724-L. (German.) **Properties of Mechanically Treated Metal Surfaces.** Rolf Krause. *Metalloberfläche,* Ausgabe A, v. 9, no. 9, Sept. 1955, p. 135-140.

Structure of a mechanically treated surface; running-in process of amorphous and crystalline surface sheaths. Micrographs, diagram. 7 ref. (L10, M26, M27)

725-L. (German.) **Influence of Hardness and Melting Point on the Finishing of Metals.** A. Wisken and H. Raether. *Metalloberfläche,* Ausgabe A, v. 9, no. 9, Sept. 1955, p. 140-143.

Treats role of hardness and temperature in polishing of metal surface. Experimental data. Diagram, graphs, micrographs. 5 ref. (L10, Q29)

726-L. Silver Plating Aluminum Bus Bars. Julius Toth and H. E. Ricks. *Metal Finishing,* v. 53, Oct. 1955, p. 44-46.

Critical point is establishing silver film on the oxide-free base metal. Complete process described. Photographs, graph, diagram. (L17, Ag, Al)

727-L. Copper-Tin-Zinc Plating. J. B. Mohler. *Metal Finishing,* v. 53, Oct. 1955, p. 47-51.

Various plating alloys, their properties and applications. Industrial plating conditions. Table, photographs. 16 ref. (L17, Cu, Sn, Zn)

728-L. Surface Treatment and Finishing of Light Metals. pt. 2, VII. Industrial Anodizing of Aluminum and Its Alloys. S. Wernick and R. Pinner. *Metal Finishing,* v. 53, Oct. 1955, p. 52-56, 60.

Interrelation of operating details, thickness and qualities of the coat, effects of impurities, chromic acid processes. Tables, graphs, photographs. (To be continued.) (L19, Al)

729-L. Electroless Plating in Production. Thomas A. Dickinson. *Metal Treating,* v. 6, Sept.-Oct. 1955, p. 22, 24, 26-27.

Process makes it possible to prevent corrosion, reclaim over-machined parts, improve abrasion resistance and obtain decorative finish effects where electroplating is impractical. Photographs. table. (L14, Ni)

730-L. Anodized Insulation. *Modern Metals,* v. 11, Oct. 1955, p. 78.

Uses and advantages of an aluminum oxide in the winding of electromagnetic coils for transformers, solenoids and some motors and generators. Photographs. (L19, Al)

731-L. Organic Coatings for Electroplaters. Wayne R. Fuller. *Plating,* v. 42, Oct. 1955, p. 1271-1272.

Types of clear and colored transparent product finishes most suitable for different conditions of service and for use on chrome plate, solid brass, brass plate and aluminum. (L26, Al, Cu, Cr)

732-L. Chromium Plating Rocket Motors at Ryan. Bernard W. Floersch. *Steel Processing,* v. 41, Oct. 1955, p. 657-658.

Used to protect base material from heat of thrust. Photographs. (L17, Cr)

733-L. (English.) **Operating M.B.V. as a Continuous Process.** Y. C. Cheng, Y. Y. Li and Y. Chu. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 73-77.

Continuous service of this well-known surface finishing method for aluminum obtained by regularly introducing corrective additions of sodium dichromate and sodium carbonate solutions. Tables, graph. 4 ref. (L14, Al)

734-L. (French.) **Growth of Alumina Films on Super-Purity Aluminum-Alloy Single Crystals Containing 3% Magnesium.** Jean Herenguel and Pierre LeLong. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 63-66 + 1 plate.

Confirms differences in anodizing rate according to crystal orientation. Micrographs, photographs, diagrams, graphs. 6 ref. (L19, Al)

735-L. (French.) **The Formation of Oxide Layers Observed on Aluminum Immersed in Nitric Acid.** Jos Patrie. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edi-

tion et de Documentation des Alliages Légers, p. 67-72.

Behavior of electrically insulated and noninsulated aluminum in various concentrations of nitric acid. Graphs, diagrams. 5 ref. (L14, Al)

736-L. (Polish.) **Diffusion Coatings on Ductile Cast Iron.** Waclaw Sakwa. *Wiadomosci hutnicze,* v. 11, no. 9, Sept. 1955, p. 266-269.

Chemical compositions of chromite mixtures; temperature, time, other conditions for chromium diffusion coating. Graph, table. 6 ref. (L15, Cr, CI)

737-L. The Painting of Ships. T. A. Banfield. *Corrosion Technology,* v. 2, Oct. 1955, p. 302-306, 316.

Problems from viewpoint of paint manufacturer. Photographs. 12 ref. (L26, ST)

738-L. Bright Nickel Plating Solutions. T. E. Such. *Electroplating and Metal Finishing,* v. 8, Oct. 1955, p. 347-350.

Special features required for the characteristics of plating, including sensitivity to cleanliness of base metal, throwing power of solution, use of wetting agents, treatment of passive deposits before chromium plating, production control tests. Photographs, diagram. 10 ref. (L17, Ni)

739-L. Electric Radiant Heating for Paint Drying and Stoving Processes. F. Hunt. *Electroplating and Metal Finishing,* v. 8, Oct. 1955, p. 343-346, 366.

Established because it is suited to mass production methods and fits easily into mechanical sequence. Graph, photographs. (L26)

740-L. Mould Spraying. H. J. Plaster. *Electroplating and Metal Finishing,* v. 8, Oct. 1955, p. 354-358.

Properties of sprayed metal coatings in relation to the requirements of die materials; method of making dies by metal spraying on to a master pattern. Tables, photographs, diagrams. 5 ref. (L23, Sn, Cr, ST)

741-L. Finishing Before Fabrication. *Finish,* v. 12, Nov. 1955, p. 35-38, 50.

Continuous cleaning and phosphatizing, infra-red drying and baking, continuous spraying, roller coating and offset printing are used. (L general, Al)

742-L. A.I.D. Testing and Application of Aircraft Finishes. S. G. Anderson. *Industrial Finishing (London),* v. 9, Sept. 1955, p. 80-82.

Types of paint used and tests for bend, toughness, scratch, natural weathering, resistance to organic solvents, sea water, wet scratch and cold check. Photographs. (L26, Al)

743-L. Lacquer, Synthetic Enamel Coatings and Stoving Finishes. A. A. B. Harvey. *Industrial Finishing (London),* v. 9, Sept. 1955, p. 84, 86, 88.

Principles governing selection of a finish for specific purposes. Photograph. (To be continued.) (L26, L27)

744-L. Flame Plating Clads for Better Wear Resistance. *Iron Age,* v. 176, Oct. 27, 1955, p. 88-89.

Principle of flame plating based on the ignition of oxygen and acetylene, producing heat and pressure waves. Detonation occurs when heat waves move faster than pressure waves, but when pressure block created by heat is broken, carbide powder is hurled at workpiece surface at supersonic speed. Photograph. (L24, C-n)

745-L. A Critical Comparison of Aluminum Coating Methods. G. T. Sink. *Light Metal Age,* v. 13, Oct. 1955, p. 20-23, 35.

Discusses and compares seven systems—two Iridite, two Alodine, chromic acid and sulfuric acid anodizing, and hard oxide coating. Photographs, graph, tables. (L19, L14, Al)

746-L. Improvement in Electroplating Due to Ultrasonics. Stanley R. Rich. *Plating,* v. 42, Nov. 1955, p. 1407-1411.

Low-frequency vibrations at 20 kc. per sec. eliminate anode polarization, permit plating at accelerated rates, minimize edge build-up and produce uniform, well-bonded coatings. Graphs, photographs. (L17)

747-L. Some Aspects of Solution Level Control. John W. Holland, Loren D. Stevens and Nello R. Arterburn. *Plating,* v. 42, Nov. 1955, p. 1412-1415.

Economy in plating, avoiding stream pollution and keeping rejects low are obtained by various methods. Diagrams. (L17, S18)

748-L. The Treatment of Certain Plating Solutions by Ion Exchange. Edward B. Tooper. *Plating,* v. 42, Nov. 1955, p. 1416-1420.

Proper use of resin can purify solutions and recover chemicals such as chromic acid. Graphs, photograph. 4 ref. (L17, A8)

749-L. The Effect of Mica on the Embrittlement of Anti-Corrosive Primers for Steel. H. W. Chatfield. *Product Finishing,* v. 8, Oct. 1955, p. 50-56.

Aging embrittlement can be reduced by adding water-ground mica without affecting anticorrosive properties. Tables, micrographs. (L26, Q23, ST)

750-L. Diffusion Coating With Metallic Halides. II. I. Jenkins. *Product Finishing,* v. 8, Oct. 1955, p. 61-66, 68.

Halide and carbonyl processes and physical characteristics, properties and applications of diffusion coatings. Photograph, diagram, graphs, micrographs. (L15)

751-L. Mechanism of Blister Formation in Cast Iron Vitreous Enamels. E. R. Evans. *Product Finishing,* v. 8, Oct. 1955, p. 67-78.

Examination of defective enameled castings, experiments to prove or disprove beliefs, study of gas evolution characteristics of light casting irons. Diagrams, micrographs, photograph, graphs. (L27, CI)

752-L. Some Basic Principles of Continuous Electroplating of Wire. A. B. Ashton. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1163-1166, 1293.

Lineal speed, immersed length, starting and finishing diameters, current density. Tables. (L17)

753-L. Solution Coating of Copper Wire. C. A. Litzler. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1198 + 9 pages.

Design and engineering considerations for precision applications of electrical enameling solutions. Photographs, diagrams. (L27, Cu)

754-L. Tin-Zinc Alloy Plating; Its Application to Copper Wire. Frederick A. Lowenheim and Robert T. Gore. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1219-1221, 1295-1297.

Process is established and adaptable to any set-up designed for alkaline tin plating. Photographs. 3 ref. (L17, Zn, Sn, Cu)

755-L. (German.) **Action of Iron-Saturated Zinc Melts on Sulfur and Phosphorus-Containing Iron.** Dietrich Horstmann. *Archiv für das Eisenhüttenwessen,* v. 26, no. 10, Oct. 1955, p. 577-581.

Determination of iron losses. Formation of crystal structure and growth of iron-zinc alloy layer. Tables, graphs, micrographs. 6 ref. (L16, M26, Fe, Zn)

756-L. (German.) **Precious-Metal Plating for the Electrical Industry.** W. Rienäcker. *Metall,* v. 9, nos. 19-20, Oct. 1955, p. 887-888.

Plating of silver, gold, platinum and their alloys on copper, nickel, steel and tin, with a ratio 1:2 and even 1:1 between the precious metal and the base. Photographs. (L17, Sn, ST, Ni, Cu, EG-c)

SECTION M

METALLOGRAPHY, CONSTITUTION and PRIMARY STRUCTURES

1-M. Titanium-Manganese Phases. Harold Margolin and Elmars Ence. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1267-1268.

Tests on alloys between 31 and 70% manganese show that from four to six phases exist. Table, micrograph. 7 ref. (M24, Ti, Mn)

2-M. (French.) **Crystallographic Calculations for Cubic Metals.** Micheline Sternberg. *Métaux, Corrosion-Industries,* v. 29, no. 349, Sept. 1954, p. 335-346.

Crystallographic analysis of simple Laue diagram. Diagrams, photograph, tables. 2 ref. (M26)

3-M. (German.) **Experimental Studies on Contrast in the Electron Microscope.** W. Lippert. *Optik,* v. 11, no. 9, 1954, p. 412-421.

Differences in transmission factors of equally prepared foils and use of transmission-factor measurements for thickness determinations. Graphs, micrographs. 14 ref. (M21, S14, Al)

4-M. (Russian.) **Determination of the Number of Vacancies and of the Energy of Vacancy Formation in Metals and Alloys.** S. D. Gertsriken. *Doklady Akademii Nauk SSSR,* v. 98, no. 2, Sept. 11, 1954, p. 211-213.

Temperature and its effect on change in the length of specimen. Quenching from high temperatures fixes vacancies. Graphs, table. 10 ref. (M26, Ag, Al, Cu, Pt, Ir)

5-M. Electronic Structure of Primary Solid Solutions in Metals. J. Friedel. *Advances in Physics,* v. 3, Oct. 1954, p. 446-507.

Lattice structures, molecular orbitals. Diagrams, graphs, tables. 110 ref. (M26)

6-M. An X-Ray Diffraction and Vapor Pressure Investigation of the Rhenium-Germanium Phase Diagram. Alan W. Searcy, Robert A. McNees, Jr., and John M. Criscione. *American Chemical Society, Journal* v. 76, Nov. 5, 1954, p. 5287-5289.

One germanide ($ReGe_2$) was found and some of its properties determined. Table, graph, phase diagram. 8 ref. (M24, Re, Ge)

7-M. Coercive Force: Possible Measure of Degree of Malleablization. D. S. Eppelsheimer and D. S. Gould. *American Foundryman,* v. 26, Nov. 1954, p. 41-43.

Magnetic measurements agree with hardness and metallographic tests. Photographs, graphs, micrographs. 4 ref. (M23, P16, J23, CI)

8-M. Metals With Whiskers. Sydney M. Arnold. *Bell Laboratories Record,* v. 32, Nov. 1954, p. 417-420.

Conditions of growth on electronic components. Photographs, micrographs. (M26, Zn, Cd, Sn)

9-M. A Method of Examining Selected Areas of Surfaces Using Replicas and the Electron Microscope. G. R. Booker. *British Journal of Applied Physics,* v. 5, Oct. 1954, p. 349-350.

Use of wet-stripped replicas. Diagram, micrograph. 6 ref. (M21)

10-M. Formation of Metallic Compounds of Iron. (Digest of "Several Regularities in the Formation of Metallic Compounds of Iron", by I. I. Kornilov; *Doklady Akademii Nauk SSSR,* v. 91, 1953, p. 261-263.) *Metal Progress,* v. 66, Nov. 1954, p. 166, 168.

Effects of atomic size and position in the periodic system on formation of intermetallic compounds. (M26)

11-M. Some Experiences With a New Metallurgical Mounting Plastic. P. A. Lovett. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 201-203.

Experience with a cold-setting plastic. Photograph, micrographs. (M21)

12-M. Dislocations. A Review of Some Recent Books. M. A. Jaswon. *Research,* v. 7, Nov. 1954, p. 457-464.

Theory, strain energy, edge and screw dislocations and stress boundaries. Diagrams. 4 ref. (M26)

13-M. (German.) **The Crystal Structures of ZrSi and $ZrSi_2$.** H. Schachner, H. Nowotny and H. Kudielka. *Monatshefte für Chemie,* v. 85, no. 5, Oct. 15, 1954, p. 1140-1153.

X-ray studies. Tables, graph, diagram. 11 ref. (M26, Si, Fr)

14-M. (German.) **Effect of Oxygen on the Structure and Aging of Pure Iron.** Franz Wever, Wilhelm Anton Fischer and Helmut Engelbrecht. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1521-1526.

Characteristics of molten iron, structure, notched bar toughness and hardness effects of oxygen and temperature. Photographs, graphs, micrographs. 10 ref. (M27, Q general, Fe)

15-M. (German.) **Oxide-Needle Meadows Grow on Metals.** G. Pfefferkorn. *Umschau in Wissenschaft und Technik,* v. 54, no. 21, Nov. 1, 1954, p. 654-655.

Phenomenon of whisker growth, nature and thermal conditions. Micrographs. 3 ref. (M26, N12, Cu, Fe)

16-M. (Hungarian.) **Nondestructive Metallographic Testing.** István Mester and Erik Fuchs. *Ontöde,* v. 5, no. 10, Oct. 1954, p. 218-227.

Nondestructive testing of metals with simple apparatus such as microscopes and cameras. Procedures and results. Photographs, diagrams, micrographs. 15 ref. (M21)

17-M. (Swedish.) **A Magnetic Balance for Ferromagnetic Materials.** Olle Hedebrant. *Jernkontorets Annaler,* v. 138, no. 10, 1954, p. 643-654.

Magnetic balance for study of transformations and transformation kinetics in alloys. Data for stainless steels. Photographs, diagrams, graphs, table. 5 ref. (M23, SS)

18-M. On the Determination of Nonmetallic Inclusions in Steel. Yu. T. Lukashevich-Duvanova. *Henry Brutcher, Altadena, Calif., Translation no.* 3394, 19 p. (Condensed from *Metallurg,* v. 11, no. 5, 1936, p. 19-33.)

Critical review of various methods of determining nature of nonmetallic inclusions in steel (electrolytic, chlorine, nitric acid residue methods). Tables, micrographs. 11 ref. (M28, M27, ST)

19-M. (Book.) **Dislocations in Metals.** Morris Cohen, editor. 200 p. 1954. American Institute of Mining and Metallurgical Engineers, Inc., 29 West 39th Street, New York, N. Y. $3.50.

Includes "The Nature of Dislocations in Ideal Single Crystals", J. S. Kolhler and F. Seitz; "Role of Dislocations in Crystal Growth and Grain Boundary Phenomena", W. T. Read, Jr. and W. Shockley; and "Dislocations and Mechanical Properties", E. Orowan. (M26, Q general)

20-M. A Phase Diagram for the System $Ti-TiO_2$ Constructed From Data in the Literature. R. C. DeVries and Rustum Roy. *American Ceramic Society Bulletin,* v. 33, Dec. 1954, p. 370-372.

Possible phase diagram for the system $Ti-TiO_2$ summarizes various data in the literature. Diagram. 16 ref. (M24, H11, Ti)

21-M. An Improved Method for the Taper Sectioning of Metallographic Specimens. L. E. Samuels. Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Technical Note 21, Apr. 1954, 6 p.

Method using simple machining jig accurately measures taper ratio of finish polished section. Photographs. 5 ref. (M21)

22-M. (French.) **Study of the Effect of Tempering on the Microstructure and the Mechanical Properties of Chromium-Molybdenum Steels at Room and Elevated Temperatures.** A. Constant and G. Delbart. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 777-794; disc., p. 794.

Changes due to various tempering temperatures are explained by a physico-chemical change and coalescence of carbides. Graphs, micrographs, tables. 10 ref. (M27, Q general, AY)

23-M. (French.) **A New Method of Interpreting Debye-Scherrer Patterns.** G. A. Homes and J. Gouzou. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 749-757.

Construction of reciprocal lattice, calculations, advantages and limitations. Tables, diagrams. 27 ref. (M22)

24-M. (French.) **Study of the Kirkendall-Smigelskas Effect in Copper-Brass Couples in the Presence of Impurities.** A Accary. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 771-772; disc., p. 773.

Effects of phosphorus additions suggest interaction of the impurity and the lattice vacancies. Graph, tables. 6 ref. (M26, Cu)

25-M. (French.) **Method of Differentiation of Cu_2O and Cu_2S on Copper**

Micrographs. L. A. Boschi, H. Destaillats, J. A. Sabato, J. M. Valls and A. Varsavsky. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 774-776.

Identification of inclusions in electropolished specimens. Micrographs. (M21, M27, Cu)

26-M. (German.) **Transformation Limits of the Iron-Nickel System in the Temperature Range Below 300° C.** Franz Lihl. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 475-478.

Review of difficulties of determining the equilibrium diagram at low temperature; reduction of solid solutions of intermetallic compounds permits production of fine alloy powders; the amalgam process of producing iron-nickel and other powders; X-rays as a means of establishing equilibria below 300° C. Graphs, table. 16 ref. (M24, H10, Fe, Ni)

27-M. (German.) **Contributions to the Metallurgical Analysis of Several Copper Alloys.** W. F. B. Timpe and F. Pawlek. *Metall,* v. 8, nos. 21-22, Nov. 1954, p. 834-841.

Isolation of oxide inclusions in tin and aluminum bronzes and in copper and their study under the photomicroscope and the ultra microscope; chemical, X-ray and electron microscopic analyses. Micrographs, graphs, table, diagram. 45 ref. (M21, M22, S11, Cu, Sn, Al)

28-M. (German.) **Precision Determination of the Lattice Constants of Silver by the Back-Reflection Method.** Gerhard Becherer and Rudolf Ifland. *Naturwissenschaften,* v. 41, no. 20, Oct. 1954, p. 471.

Brief report. 4 ref. (M26, M22, Ag)

29-M. (German.) **Magnetic Pattern Samples on Martensite.** Wilfried Andrä. *Annalen der Physik,* v. 15, no. 1, 1954, p. 31-34.

Application of magnetic field on martensitic steel reveals characteristic patterns. Micrographs. 6 ref. (M23, ST)

30-M. (Polish.) **X-Ray Investigation Into Identification of Crystalline Phases in Iron Ores.** Z. Bojarski and J. Kacprzak. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 264-274.

Lower limits of recognizability of several commercial ores. Refractograms, tables. 10 ref. (M26, M23, Fe)

31-M. (French.) **Structure and Texture of Metallic Layers of Nickel Obtained by Evaporation and Determined With the Use of the Electron Microscope and Electron Diffraction.** W. M. H. Sachtler, G. Dorgelo, and W. van der Knaap. *Journal de chimie physique,* v. 51, no. 9, Sept. 1954, p. 491-495 + 4 plates; disc., p. 496.

Cause of orientation of a condensed nickel film and the crystallographic faces present on the surface of an oriented film. Diagrams, micrographs, tables. 12 ref. (M26, N16, Ni)

32-M. (Russian.) **Structure of the Primary Grain of Alloyed Steels During High-Temperature Heating.** V. N. Svechnikov and B. A. Movchan. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 10, Oct. 1954, p. 1823-1829 + 2 plates.

Segregation of various elements and effects on structure and mechanical properties. Micrographs. 15 ref. (M27, Q general, AY)

33-M. **The Hot-Stage Microscope and Its Use With the Cine-Camera.** S. G. Glover. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 181-183.

Conditions governing use, observation of shear-type transformations and photographic techniques. Photograph, micrograph. 6 ref. (M21, M23)

34-M. **Examination of Metallic Surfaces by Electron-Diffraction Methods.** E. C. Williams. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 183-185.

General principles, techniques for metallic surfaces, experiences with 99.8% pure silver. Diffractograms. 2 ref. (M22, Ag)

35-M. **Electron-Optical Methods in Constitutional Metallurgy.** J. W. Menter. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 185-192.

Principles of various systems, advantages and applications. Diagrams, micrographs. 37 ref. (M21)

36-M. **Automatic Recording of Dilatometer Measurements.** F. G. Haynes. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 193-196.

Advantages and application of various methods. Diagram, photographs, graphs. 10 ref. (M23)

37-M. **The Physical Nature of a Metal Surface in Conduction Theory.** H. A. Müser. *Philosophical Magazine,* v. 45, 7th ser., no. 371, Dec. 1954, p. 1237-1246.

Attempts to identify a mechanism of electron diffraction which would lead to the conclusion that specular

reflection is rendered impossible. Diagrams, graphs. 7 ref. (M22, P17)

38-M. (English.) **Statistics of Two-Dimensional Lattices With Many Components.** Taro Kihara, Yukio Midzuno and Toshio Shizume. *Physical Society of Japan, Journal,* v. 9, no. 5, Sept.-Oct. 1954, p. 681-687.

Mathematical model for generalizing the Ising lattice. Diagrams, table, graph. 7 ref. (M26)

39-M. (German.) **The Binary and Multiple Systems of the B Metals. The Quinary System Cadmium-Germanium-Indium-Tin-Zinc.** H. Spengler. *Metall,* v. 8, nos. 23-24, Dec. 1954, p. 936-939.

Thermal and microscopic investigations, melting equilibria in polythermal diagrams. Diagrams. 19 ref. (M24, Cd, Ge, In, Sn, Zn)

40-M. (German.) **The Cerium-Lanthanum, Lanthanum-Antimony, and Cerium-Indium Phase Diagrams.** Rudolf Vogel and Helmut Klose. *Zeitschrift für Metallkunde,* v. 45, no. 11, Nov. 1954, p. 633-638.

Thermal and microscopic investigation. Lattice determination of the compound $CeIn_3$. Graphs, tables, micrographs. 8 ref. (M24, Ce, La, Sb, In)

41-M. (German.) **Structural Investigations of Alloys Between B-Metals Lean in Valence Electrons.** Konrad Schubert, Ulrich Rösler, Werner Mahler, Erhard Dörre and Waldemar Schütt. *Zeitschrift für Metallkunde,* v. 45, no. 11, Nov. 1954, p. 643-647.

Measurements of lattice constants of In_2Sn, $InSn_4$, $CdSn_9$, CdHg, MgCd and their interpretation. Tables, diagrams, graphs. 28 ref. (M26, In, Sn, Cd, Hg, Mg)

42-M. (Hungarian.) **Nondestructive Metallographic Examiation.** Istvan Mester and Erik Fuchs. *Ontöde,* v. 5, no. 10, Oct. 1954, p. 217-227.

Apparatus for electrolytic polishing, etching and examination of microstructures of surfaces of finished or semifinished parts. Diagrams, micrographs, photographs. 15 ref. (M21, M27)

43-M. (Russian.) **Influence of Aluminum on the Magnitude of the Interatomic Bonds of Silver.** B. N. Finkel'shtein and A. I. Iamshchikova. *Doklady Akademii Nauk SSSR,* v. 98, no. 5, Oct. 11, 1954, p. 781-782.

Experimental data for silver-aluminum alloys varying from 2.3 to 100% silver at temperatures from 490 to 700° C. Graph, tables. 6 ref. (M25, Al, Ag)

44-M. (Russian.) **X-Ray Investigation of Interatomic Reaction in Nickel Base Solid Solutions.** G. V. Kurdiumov and N. T. Travina. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 77-80.

Relation of strength of bonding forces in the crystal lattice and content of alloying elements. Tables, graphs. 5 ref. (M25, M26, Ni, Cr, Ti, Al, Fe)

45-M. (Russian.) **X-Ray Structural Investigation of Electrodeposits of Ag-Pd and Cu-Pd.** Iu. D. Kondrashev and I. P. Tverdovskii. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 109-111.

Variation of average dimensions of crystals and distortion of the lattice; formation of continuous series of solid solutions. Graphs. 7 ref. (M26, L17, Ag, Pd, Cu)

46-M. (Book.) **Dynamical Theory of Crystal Lattices.** Max Born and Kun Huang. International Series of Monographs on Physics. 430 p. 1954. Oxford University Press, 114 Fifth Ave., New York 11, N. Y. $8.00.

Atomic forces, lattice vibrations, elasticity, stability, thermodynamics of lattices, free energy, optical effects, dielectrics, and piezoelectric properties. (M26, P general)

47-M. (Book.) **The Microphysical World.** William Wilson. 216 p. 1954. Philosophical Library, Inc., 15 E. 40th St., New York, N. Y.

Simplified presentation of the structure and behavior of atoms, protons, neutrons, and more minute objects, and how they participate in and contribute to the phenomena of heat, light, electro-magnetism, radioactivity, etc. (M25, P general)

48-M. (English.) **Note on the Disorientation and Impurity Substructures in Zinc Single Crystals.** K. F. Hulme. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 810-815.

The Berg-Barrett technique was used to show that disorientation boundaries and impurity-rich regions sometimes coincide. Micrographs. 12 ref. (M26, Zn)

49-M. (English.) **The Structure of the $Co_3W_9C_4$ Phase.** N. Schönberg. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 837-840.

X-ray data on unit cell size and positions of the various atoms in the hexagonal cell. Tables. 8 ref. (M26, Co, W, C)

50-M. (English.) **The Influence of Aluminum on the Occupation of Lattice Sites in the TiAl Phase.** R. P. Elliott and W. Rostoker. *Acta Met-*

allurgica, v. 2, no. 6, Nov. 1954, p. 884-885.

Refraction data show that aluminum atoms replace titanium atoms on some sites but otherwise preserve long range order. Graphs, table. 6 ref. (M25, Ti, Al)

51-M. (English.) **Diffraction Studies of Possible Ordering in Alpha-Brass.** D. T. Keating. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 885-887.

No ordering detected by either X-ray or neutron diffraction. Graphs. 4 ref. (M22, N10, Cu, Zn)

52-M. (English.) **Equilibrium Segregation of Silicon at Grain Boundaries in Nickel-Iron-Copper-Molybdenum Alloys.** R. E. S. Walters. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 890, 891, 893.

Equilibrium concentration of silicon appears to be higher at grain boundaries than in the crystals at temperatures below 800° C. Micrograph. 1 ref. (M27, Ni, Fe, Cu, Mo)

53-M. Wet-Process Autoradiography Modified for Studying Metals. George C. Towe, Henry J. Gomberg, and J. W. Freeman. *Nucleonics,* v. 13, Jan. 1955, p. 54-58.

Includes graph, micrographs. 2 ref. (M23)

54-M. Properties of Metallic Phases as a Function of Number and Kind of Bonding Electrons. Niels Engel. *Powder Metallurgy Bulletin,* v. 7, Dec. 1954, p.8-18.

Theory of metallic bonding with special reference to cermets. Graphs, table. 9 ref. (M25, H11)

55-M. The Preparation of Titanium Carbide Specimens for Microscopic Study. Ronald Silverman and Patricia D. Luscz. *Powder Metallurgy Bulletin,* v. 7, Dec. 1954, p. 25-28.

Technique for unbound specimens. Micrographs. 3 ref. (M21. C-n)

56-M. (Russian.) **Etching Steel by Ionic Bombardment.** I. N. Prilezhaeva, G. V. Spivak and M. I. Malkina. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 11, Nov. 1954, p. 2090-2096.

Applicability of ionic etching to various types of steel, including high strength and heat resistant steels. Effects of varying voltage, current density, etc. Micrographs. 9 ref. (M21, AY, SS)

57-M. Physical Chemistry of Steel. IV. The Problem of Structure. J. A. Kitchener. *Iron & Steel,* v. 28, Jan. 1955, p. 3-7.

Problems in the structure of liquid steel. Diagrams, graph, tables. 15 ref. (M26, P12, ST)

58-M. Non-Metallic Inclusions. IV. Microscopical Examination of Inclusions. H. B. Bell. *Iron & Steel,* v. 28, Jan. 1955, p. 8-10.

Techniques for identifying inclusions in various metals. 33 ref. (M27, M28)

59-M. The Size of Interstitial Solute Atoms in Close-Packed Metals. Kenneth A. Moon. *Journal of Physical Chemistry,* v. 59, Jan. 1955, p. 71-76.

Develops better method of calculation from X-ray lattice data. Tables, graphs. 22 ref. (M26)

60-M. Preparation of Specimens for the Electron Diffraction Camera. P. R. Rowland. *Vacuum,* v. 3, Apr. 1953, p. 133-150.

Preparation of specimens for the transmission and reflection methods, reactions carried out in the camera, precautions. Diagrams, diffraction patterns, micrographs, tables. 31 ref. (M22)

61-M. (Russian.) **Certain Peculiarities of Internal Structure of Silicon Carbide Crystals and the Spiral Microrelief of Their Faces.** N. V. Gliki. *Doklady Akademii Nauk SSSR,* v. 99, no. 2, Nov. 11, 1954, p. 255-258 + 1 plate.

X-ray diffraction and electron-microscope investigation. Micrographs. 7 ref. (M26)

62-M. (Russian.) **Distortion of the Crystal Lattice in Solid Solutions of Cobalt and Palladium in Iron.** V. I. Iveronova and A. A. Katsnel'son. *Doklady Akademii Nauk SSSR,* v. 99, no. 3, Nov. 21, 1954, p. 391-394.

Determination of mean values of static displacement in iron-palladium alloys and iron-cobalt alloys. Tables, diagrams. 7 ref.
(M26, Fe, Pd, Co, Ni, Cu, Zn, Al)

63-M. (Russian.) **Problem of the Structure of Oxide Films on Molten Aluminum and Its Alloys.** M. V. Mal'tsev, Iu. D. Chistiakov and M. I. Tsypin. *Doklady Akademii Nauk SSSR,* v. 99, no. 5, Dec. 11, 1954, p. 813-814 + 1 plate.

Films formed at various temperatures on binary Al-Mg, Al-Cu, Al-Zn, and Al-Fe, and more complex industrial alloys. Electron-diffraction patterns. 5 ref.
(M26, Al, Mg, Cu, Zn, Fe)

64-M. Titanium-Lead System. Paul Farrar and Harold Margolin. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 101-104.

Studies on the region 0 to 58% lead from 500° C. to liquidus temperatures. Three reactions were

found. Tables, graph, micrographs. 6 ref. (M24, Ti, Pb)

65-M. Selected Isothermal Sections in the Titanium-Rich Corners of the Systems Ti-Fe-O, Ti-Cr-O, and Ti-Ni-O. W. Rostoker. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 113-116.

Shape and disposition of the ternary intermediate-phase fields for compounds isomorphous with Fe_3W_3-C. Graphs, micrographs. 8 ref. (M24, Ti, Fe, Cr, Ni)

66-M. Chromium-Rich Portion of the Chromium-Nickel Phase Diagram. Charles Stein and Nicholas J. Grant. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 127-134.

Study confirms existence of a eutectoid reaction at 1215° C. and a eutectic reaction at 1343° C. Graphs, tables, micrographs. 15 ref. (M24, Cr, Ni)

67-M. (English.) **Investigations on the Double Carbides in the Cobalt-Tungsten-Carbon System.** Roland Kiessling. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 1065-1068.

Preliminary report on existence of two double carbides in the system. Refractograms, tables. 5 ref. (M24, H general, Co, W)

68-M. (Czech.) **Study of Structures of Isothermal Decomposition of Supercooled Austenite With the Electron Microscope.** Ladislav Bezdek and Dalibor Ruzicka. *Hutnické Listy,* v. 9, no. 12, Dec. 1954, p. 719-727.

Study at magnifications up to 20,000 X of a carbon toolsteel. Table, graphs, micrographs. 4 ref. (M27, N8, TS)

69-M. (French.) **High-Temperature Furnace for the Electron Microscope.** N. Takahashi, K. Itoh, T. Itoh, M. Watanabe, K. Mihama and T. Takeyama. *Metaux, Corrosion-Industries,* v. 29, no. 351, Nov. 1954, p. 431-437.

Apparatus for high-temperature microscopy. Diagrams, micrographs, photograph. 4 ref. (M21)

70-M. (German.) **The Question of the Appearance of Ti_2Fe.** Wolfgang Gruhl and Dieter Ammann. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 599-600.

X-ray investigations of iron-titanium crystals and identification of intermetallic compound Ti_2Fe. Photograph, refractogram, table. 10 ref. (M26, Ti, Fe)

71-M. (German.) **Application of Zephirol Etching in the Investigation of Temper Brittleness, Aging Brittleness, and Stress-Corrosion of Steels.** Hans-Kurt Görlich, Egon Koerfer, Günter Obelode and Hermann Schenck. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 613-617; disc., p. 617-619.

Study of the suitability of zephirol, nitric acid, and picric acid as selective etchants. Micrographs, tables. 15 ref. (M21, Q23, R1, AY)

72-M. (German.) **A Process for Thermoplastic Target Preparation.** Friedrich Leonhard. *Mikroskopie,* v. 62, no. 2, Dec. 1954, p. 129-137.

Improved devices and methods for replica method of investigating metals by electron microscopy. Diagram, photographs, micrographs. 9 ref. (M21)

73-M. (German.) **Ternary Systems With Two Rare Earth Metals. Example of Silver-Cerium-Lanthanum.** Rudolf Vogel and Helmut Klose. *Zeitschrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 670-673.

Thermal and metallographic determination of the constitution diagram, phases, and intermetallic compounds. Graphs, photograph, micrographs. 3 ref. (M24, Ag, Ce, La)

74-M. (German.) **Defects in the Crystal Structure of Zinc and Cadmium Monocrystals.** Sigmar German. *Zeitscrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 674-676.

Metallographic, X-ray and interference studies. Micrographs, diagrams. 6 ref. (M26, Zn, Cd)

75-M. (German.) **Investigation of the Chromium-Zinc System by the Amalgam Process.** Franz Lihl and Peter Jenitschek. *Zeitschrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 686-689.

X-ray study of specimens prepared by electrolytic deposition of chromium on a molten zinc-amalgam electrode. Table, diagram. 11 ref. (M24, L17, Cr, Zn, Hg)

76-M. (German.) **Equilibrium Diagram and Reactions in the Solid State.** G. Masing. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 941-947; disc., p. 947-948.

Data for iron-nickel, iron-molybdenum and gold-nickel alloys disproves assumption that boundary concentration of the participating

phases corresponds to the heterogeneous equilibrium. Graphs, diagram, table. 6 ref.
(M24, Fe, Ni, Mo, Au)

77-M. (Russian.) **Dislocation Theories of Strength and Plasticity. A. V.** Stepanov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 9, Sept., p. 90-107.

Critical analysis; local fractures in anisotropic, nonhomogeneously periodic media. Diagrams. 14 ref.
(M26, Q23)

78-M. (Book.) **Concerning the Nature of Things.** William Bragg. 231 p. 1954. Dover Publications, 1780 Broadway, New York 19, N. Y. $1.25 paper, $2.75 cloth.

Series of lectures covering the atomic structures of gases, liquids, and crystals of diamonds, ice and snow, and metals. (M25)

79-M. An Apparatus for Electropolishing Specimens for Metallographic Examination. E. C. Sykes, V. J. Haddrell, H. R. Haines and B. W. Mott. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 166-168.

Low-cost unit which produces specimens completely free of flow lines caused by gas bubbles. Diagrams. 6 ref. (M21)

80-M. The Constitution of Aluminium-Rich Alloys Containing Copper, Manganese and Silicon. A. P. Bagchi and H. J. Axon. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 176-180.

Metallographic study of chill-cast specimens annealed at 460° C. for 21 days. Graphs. 15 ref.
(M24, Al, Cu, Mn, Si)

81-M. A Study of the Behaviour of Titanium-Rich Alloys in the Titanium-Tin and Titanium-Aluminium Systems. A. D. McQuillan. *Institute of Metals, Journal,* v. 83, Jan. 1955 p. 181-184.

Effects of aluminum and tin on the alpha $\rightleftarrows$ beta transformation in titanium studied by the hydrogen pressure method. Graphs. 10 ref.
(M24, N6, Ti, Al, Sn)

82-M. Useful Microscopic Techniques. (Digest of "Progress in Metallurgical Microscopy", by B. W. Mott; *Endeavor,* v. 12, July 1953, p. 154-161.) *Metal Progress,* v. 67, Feb. 1955, p. 168, 170, 172.

Improvements in accessories and practices. (M21)

83-M. Photographing Stretcher-Strain Markings With the Vickers Projection Microscope. T. D. Boxall and B. B. Hundy. *Metallurgia,* v. 51, no. 303, Jan. 1955, p. 52-54.

Illumination technique for magnifications of 3 to 15X. Photographs, micrographs, diagrams.
(M21, CN)

84-M. On the Structure of the Carbide Phases of Vanadium. M. A. Gurevich and B. F. Ormont. *Henry Brutcher Translation no.* 3414, 8 p. (From *Doklady Akademii Nauk SSSR,* v. 96, no. 6, 1954, p. 1165-1168.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 331-M, 1954. (M26, V)

85-M. (French.) **Spiral Substructure in an Aluminum Beta-Gamma-Brass.** Pierre A. Jacquet. *Comptes rendus,* v. 239, no. 25, Dec. 20, 1954, p. 1799-1801.

Electropolishing reveals figures very comparable to those found on growth faces of various mineral crystals. Micrographs. 4 ref.
(M27, Al, Cu)

86-M. (French.) **Interpretation of Spiral Substructures Observed in Aluminum Beta-Gamma-Brass.** Adrienne R. Weill and Pierre A. Jacquet. *Comptes rendus,* v. 239, no. 25, Dec. 20, 1954, p. 1801-1803.

Spirals observed result from a precipitation obeying a mechanism imposed by the assemblage of solute atoms and dislocations. 6 ref.
(M26, Al, Cu)

87-M. (French.) **New Precision Chamber for Studying the Parameter of Alloys With Structural Hardening.** R. Graf. *Recherche Aéronautique,* 1954, no. 42, Nov.-Dec., p. 51-54.

Precision chamber for X-ray study of crystalline lattice; source and elimination of errors. Diagrams, photograph. 6 ref. (M26)

88-M. (French.) **Some Aspects of Oxidation of Iron at High Temperature and Low Oxygen Pressures Leading to a Micrographic Method for the Study of Gamma Iron Structure.** J. Bardolle. *Revue de métallurgie,* v. 51, no. 12, Dec. 1954, p. 833-837; disc., p. 837-838.

The number of protoxide nuclei is different for each crystallographic plane. Possibility of studying alpha $\rightleftarrows$ gamma transformations by this technique. Micrographs, diagram. 3 ref. (M23, M26, N6, Fe)

89-M. (German.) **Regularities in Electron-Refraction Recordings of Antimony Films With Texture.** Ulrich Zorll. *Zeitschrift für Physik,* v. 139, no. 5, 1954, p. 649-653.

Textures of thin vapor-deposited antimony revealed by irradiation

with fast electrons. Diagrams, refractograms. 3 ref. (M23, Sb)

90-M. (German.) **Lattice Constants and Texture of Thin Indium Films.** U. Zorll. *Zeitschrift für Physik,* v. 139, no. 5, 1954, p. 654-657.

Determined with aid of lithium fluoride grid and obliquely incident electron beams. Interferograms, graph. 5 ref. (M26, In)

91-M. (Russian.) **Problem of the Use of Photoelements in the Metallographic Investigation of Cast Iron.** E. I. Egorov and Iu. S. Romashin. *Liteinoe Proizvodstvo,* 1954, no. 9, Dec., p. 22-23.

Equipment for more precise study of microstructure. Micrographs, diagrams, graph, table. (M27, M21, CI)

92-M. A Microscopical Examination of Samples of Iron Containing Siliceous Inclusions. R. E. Lismer and F. B. Pickering. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 159-162 + 1 plate.

Means of positive identification of inclusions. Tables, micrographs. 4 ref. (M21, Fe)

93-M. Microstructures of Pyrophoric Alloys. R. D. Reiswig and David J. Mack. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 315-316.

Study of cerium-base alloys shows that best structure for lighter flints is a pyrophoric matrix with dispersed hard particles. Micrographs. (M27, Ce, Fe, Mg, Bi)

94-M. A Study of the Microstructure of Titanium Carbide. Herman Blumenthal and Ronald Silverman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 317-322.

Influence of microstructure of titanium carbide on properties of cermets. Explanation of "coring effect". Tables, micrographs. 11 ref. (M27, H general, Ti, C-n)

95-M. High-Temperature Vacuum Etching on Pure Titanium. W. D. Bennett. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 322.

High-temperature etching without contamination or increase in hardness. Micrographs. 2 ref. (M21, Ti)

96-M. Vanadium-Zirconium Alloy System. J. T. Williams. *Journal of Metals,* v 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 345-350.

Equilibria investigated by six techniques. Tables, diagrams, graphs, micrographs. 9 ref. (M24, V, Zr)

97-M. Gallium-Antimony System. I. G. Greenfield and R. L. Smith. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 351-353.

Thermal, X-ray and metallographic data. Diagram, graph, micrographs. 6 ref. (M24, Ga, Sb)

98-M. Magnesium-Rich Corner of the Magnesium - Lithium - Aluminum System. J. A. Rowland, Jr., C. E. Armantrout and D. F. Walsh. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 355-359.

Data from metallographic and X-ray studies. Micrographs, graphs. 11 ref. (M24, Mg, Li, Al)

99-M. Preliminary Investigation of the System Ti-Mg. J. W. Fredrickson. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 368.

Metallographic and X-ray studies show no compounds up to 1.5% magnesium. (M24, Ti, Mg)

100-M. Some Aspects of the Crystallization and Recrystallization of Vapor-Deposited Vitreous Selenium. N. E. Brown and F. L. VerSnyder. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955 p. 379-381.

Microstructural changes as function of heat treatment; mode of hexagonal recrystallization. Micrographs. 3 ref. (M27, N5, N12, Se)

101-M. Cellular Structure in High Purity Zinc. R. P. Steijn. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 406-407.

Observations on prismatic structure of 99.99% pure zinc. Micrographs. 6 ref. (M26, Zn)

102-M. Crystal Structure of Neodymium Metal. F. H. Ellinger. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 411.

X-ray diffraction data. Table. 3 ref. (M26, Nd)

103-M. Sigma Phase in the Molybdenum-Ruthenium System. D. S.

Bloom. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 420.

X-ray diffraction data show sigma phase is stable only above 1200° C. and exists only in a narrow composition range. Table. (M26, M24, Mo, Ru)

104-M. The Relation of Definition to Sharpness and Resolving Power in a Photographic System. George C. Higgins and Robert N. Wolfe. *Optical Society of America, Journal,* v. 45, Feb. 1955, p. 121-129.

Factors influencing quality of photographic negatives. Graphs, diagrams, photographs, table. 7 ref. (M21)

105-M. Dynamics of Simple Lattices. Herbert B. Rosenstock. *Physical Review,* v. 97, ser. 2, Jan. 15, 1955, p. 290-303.

Position and nature of singularities in frequency distribution for second-nearest and nearest neighbors. Graphs, tables, diagrams. 23 ref. (M26)

106-M. Energy Levels of a Disordered Alloy. R. H. Parmenter. *Physical Review,* v. 97, ser. 2, Feb. 1, 1955, p. 587-598.

Application of perturbation theory to crystal structure determination. Graphs, diagrams. 11 ref. (M26, N10)

107-M. Lamellar Defects in Single Crystals of Silicon. J. Franks, G. A. Geach and A. T. Churchman. *Physical Society, Proceedings,* v. 68, no. 422B, Feb. 1955, p. 111-112.

Structural defects lying on (111) and (123) planes. Similar lamellae may be introduced by plastic deformation. 3 ref. (M26, Q24)

108-M. Recent Developments in Electron Microscopy. V. E. Cosslett. *Research,* v. 8, Feb. 1955, p. 48-56.

Developments in lens design, specimen preparation, potential applications. Diagram, photographs, micrographs. 51 ref. (M21)

109-M. Single Crystals Without Dislocations. H. K. Hardy. *Research,* v. 8, Feb. 1955, p. 57-61.

Mechanism of "whisker" formation on metals. Diagrams, table, photographs, micrograph. 8 ref. (M26)

110-M. (English.) **Measurements of Electron Diffraction Intensities by Means of Geiger Counters. Experimental Determination of Relative Values of the Atomic Factor for Gold, Silver, and Aluminium.** Sven Lennander. *Arkiv för Fysik,* v. 8, no. 6, 1954, p. 551-613.

Includes tables, diagrams, photographs, circuit diagrams, graphs. 54 ref. (M22, M25, Au, Ag, Al)

111-M. (English.) **On the Carbides in Manganese Steels.** Hiroshi Yoshisaki. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 5, Oct. 1954, p. 469-476.

Studies to determine whether these carbides are solid solutions or definite chemical compounds. Graphs, diagrams, table. (M26, AY)

112-M. (Dutch.) **The Electron Micrographic Investigation of Steel Structures.** F. van Wijk and J. A. B. Dijck. *Metalen,* v. 9, no. 24, Dec. 31, 1954, p. 389-394.

Techniques for revealing structures of heat treated and cold deformed steels. Micrographs, diagram. 4 ref. (M21, ST)

113-M. (French.) **Grain Size in Cast Iron.** Michel Ferry and Jean-Claude Margerie. *Fonderie,* 1955, no. 108, Jan., p. 4299-4319 + 1 plate.

Variations in microstructure with casting and pouring temperature. Micrographs, graphs, tables, diagrams. 8 ref. (M27, E23, CI)

114-M. (German.) **Investigations on Metal Surfaces With Exo and Photoelectrons.** J. Kramer. *Metalloberfläche,* Ausgabe A, v. 9, no. 1, Jan. 1955, p. 1-6; no. 2, Feb. 1955, p. 28-31.

Exo-electron emission from irradiated surfaces as a new method of investigating surface transformations and reactions. Graphs, photograph. 13 ref. (M23, S19, P15)

115-M. (German.) **Topochemical Reactions for Investigating Structures of Electrolytic Coatings.** Artur Kutzelnigg. *Metalloberfläche,* Ausgabe B, v. 7, no. 2, Feb. 1955, p. 17-20.

Specific etching reagents for determining crystal orientations. Micrographs, diagrams, graphs. 10 ref. (M21, L17, Ni, Cr, Ag)

116-M. (German.) **Structure and Properties of the Silicides.** H. Nowotny and E. Parthé. *Planseeberichte für Pulvermetallurgie,* v. 2, no. 2, Nov. 1954, p. 34-56.

Chemical and crystal structures and properties of mono and polysilicides. Tables, diagrams, graph. 63 ref. (M26, Si)

117-M. (German.) **Spiral Growth on Crystal Planes.** H. Müller. *Umschau in Wissenschaft und Technik,* v. 55, no. 3, Feb. 1, 1955, p. 84-85.

Measurement of pitch, mechanism and cause of growth. Micrographs, diagrams. 2 ref. (M26)

118-M. (German.) **Correlation of the Outer Electron Positions in CuAu($L1_0$),**

PdCu($L2_0$), and Cu_3Au($L1_2$) Type Structures. Konrad Schubert. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 43-51.

Lattice-constant values for a large number of alloys. Graphs, tables, diagrams. 32 ref. (M26, EG-a)

119-M. (German.) **Silver-Palladium-Copper Alloys.** Ernst Raub and Georg Wörwag. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 52-57.

X-ray studies, thermal analyses and microscopic studies; ternary constitution diagram; susceptibility to age hardening. Tables, graphs, micrographs. 6 ref. (M24, N7, Ag, Pd, Cu)

120-M. (Russian.) **Influence of Aluminum on the Structure and Size of Austenitic Grain, and Impact Strength of Medium-Carbon Steel.** I. S. Gaev and V. V. Polovnikov. *Liteinoe Proizvodstvo,* 1955, no. 1, Jan. p. 18-21.

Experimental data for 0.37% carbon steel with various heat treatments. Micrographs, diagram, graphs, table. 7 ref. (M27, Q6, CN)

121-M. (Russian.) **Distribution of Secondary Electrons of Magnesium and Beryllium Alloys According to Energy.** V. N. Lepeshinskaia and V. M. Tumorin. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 11, Nov. 1954, p. 1933-1941.

Data concerning the mechanism of secondary emission of activated alloys. Graphs. 6 ref. (M25, P17, Mg, Be, Cu, Ag, Al)

122-M. **Alloys of Indium: The System Indium-Lead-Tin.** A. N. Campbell, R. M. Screaton, T. P. Schaefer, and C. M. Hovey. *Canadian Journal of Chemistry,* v. 33, Mar. 1955, p. 511-526.

Structures were determined by the X-ray and microscopic techniques. Graphs, tables, micrographs. 13 ref. (M24, In, Pb, Sn)

123-M. **Theory of Hyperfine Structure.** Charles Schwartz. *Physical Review,* v. 97, ser. 2, Jan. 15, 1955, p. 380-395.

Representation of hyperfine reactions in terms of a multipole expansion of field potentials. Graphs, table. 23 ref. (M25)

124-M. (English.) **X-Ray Measurements on Silver Filings.** F. R. L. Schoening and J. N. Van Niekerk. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 10-13.

Measurements on 99.999 and 99.6% pure silver filings at −30° C. No evidence of stacking faults observed. Table, graphs. 11 ref. (M26, Ag)

125-M. (English.) **Metallic Ternary Phases in the Mn-Ta-O System.** Nils Schönberg. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 14-16.

One metallic phase (Mn_3Ta_3O) and one of mixed metallic and non-metallic properties, were found by X-ray analysis. Tables. 1 ref. (M24, Mn, Ta)

126-M. (English.) **Some Applications of Isoactivity Lines.** Mats Hillert. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 34-36.

Connection between slope of tie-lines and change in activity along a phase boundary in ternary alloys. Diagrams. 6 ref. (M24)

127-M. (English.) **Dislocations in Polygonized Germanium.** F. L. Vogel, Jr. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 95-96.

Observations on bent and polyganized germanium single crystals. Micrographs. 6 ref. (M26, Ge)

128-M. (Book.) **Constitution of Titanium Alloy Systems.** Battelle Memorial Institute. PB 111508, 1953, 261 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $8.00.

Phase diagrams, and discussions of 48 binary and 22 ternary titanium alloy systems. (M24, Ti)

129-M. (Book—German.) **Introduction to the Investigation of Crystal Lattice by Means of X-Rays.** F. Trey and W. Legat. 112 p. 1954. Springer-Verlag, Wien I, Mölkerbastei 5, Austria.

A handbook for technicians, as a preparation for scientific monographs. Discusses one, two, and three-dimensional lattices. Observation of similarities and as variations of the lattice structures. (M26)

130-M. **Solid Solution Equilibria in the Zirconium-Hydrogen System.** Russell K. Edwards, P. Levesque and D. Cubicciotti. *American Chemical Society, Journal,* v. 77, Mar. 5, 1955, p. 1307-1311.

Phases of the system, zirconium-hydrogen determined from 1 to 760 mm. of mercury and from 600 to 900° C. Tables, graphs, phase diagram. 14 ref. (M24, Zr, H)

131-M. **Dislocations in Germanium Crystals.** F. Lincoln Vogel, Jr. *Bell Laboratories Record*, v. 33, Mar. 1955, p. 104-107.

Dislocation theory; effects of dislocations on semiconducting properties. Photographs, diagram, micrograph. (M26, Ge)

132-M. **Pseudo-Binary Phase Sections Between Laves Phases in Ternary Alloys of Uranium.** G. B. Brook, G. I. Williams and E. M. Smith.

Institute of Metals, Journal, v. 83, Feb. 1955, p. 271-276 + 2 plates.

Phase boundaries at 700 and 900° C. determined in the pseudo-binary systems UMn_2-UNi_2, UFe_2-UNi_2 and UCo_2-UNi_2. Tables, graphs, photographs, micrographs. 16 ref. (M24, U)

133-M. The Constitution of Uranium-Zirconium Alloys. D. Summers-Smith. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 277-282 + 1 plate.

Study of phases by metallographic, dilatometric and X-ray methods, using alloys prepared by arc melting. Graph, tables, micrographs. 12 ref. (M24, U, Zr)

134-M. (English.) **Phase and Structural Relations in the System Iron Tellurium.** Fredrik Gronvold, Haakon Haraldsen and John Vihovde. *Acta Chemica Scandinavica,* v. 8, no. 10, 1954, p. 1927-1942.

Alloys from 12 to 47% iron studied by X-ray diffraction. Tables, diagrams, graph. 25 ref. (M24, M27, Fe, Te)

135-M. (French.) **Relationship Between X-Ray Diffraction Diagrams and Micrographic Appearance of a Polygonized Aluminum Crystal.** Christian de Beaulieu. *Comptes rendus,* v. 240, no. 5, Jan. 31, 1955, p. 522-524.

Pure crystals polygonized by prolonged annealing show that the relative disorientation of blocks may present different appearances according to the crystallographic planes studied. Micrographs. (M26, Al)

136-M. (French.) **Determination by Electron Diffraction of the Structure of Oxide Films Formed on the Surface of Iron.** Jean Moreau and Jean Bardolle. *Comptes rendus,* v. 240, no. 5, Jan. 31, 1955, p. 524-526.

Oxide films formed at 250 to 700° C. similar to those formed under more favorable conditions. 8 ref. (M27, Fe)

137-M. (German.) **Investigations of the Structure of Steel With the Small Electron Microscope.** Ernst Kinder. *Archiv für das Eisenhüttenwesen,* v. 26, no. 2, Feb. 1955, p. 113-116.

Comparison with results from optical and large electron microscope. Micrographs. 9 ref. (M27, M21, ST)

138-M. (German.) **Basic Processes of Magnetization in Permanent Alnico Magnet Alloys.** Hermann Fahlenbrach. *Naturwissenschaften,* v. 42, no. 3, Feb. 1955, p. 64-65.

Electron microscopic investigation of structures in an optimum magnetic state. Micrographs. 2 ref. (M27, P16, SG-n)

139-M. (German.) **Measurement of Lattice Constants With Electron Beams on Thin Films of Silver.** V. Hauk and A. Krings. *Naturwissenschaften,* v. 42, no. 3, Feb. 1955, p. 68-69.

Experimental data and comparison with results obtained by other authors; factors affecting lattice-constant measurements. Graph. 7 ref. (M26, Ag)

140-M. (German.) **A New Point of View on the Problem of the Bonding State of Interstitial Structures.** Konrad Schubert. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 100-109.

Simple structures with A-1 correlation; structures with one local correlation, which deviated little from a A-1 correlation; simple structures with B-1 correlation; percarbides and related compounds; complex structures with B-1 and A-1 structures. Diagrams. 33 ref. (M26)

141-M. (German.) **Gold-Palladium-Copper Alloys.** Ernst Raub and Georg Wörwag. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 119-128.

X-ray, metallographic, and electrical resistance data to determine phase diagrams. Tables, micrographs, graphs. 13 ref. (M24, Au, Pd, Cu)

142-M. (Italian.) **New Etching Reagents for Certain Types of Ferritic, Semiferritic, Martensitic, and Austenitic Stainless Steels.** G. Catella and C. Giometto. *Metallurgia italiana,* v. 47, no. 1, Jan. 1955, p. 19-20.

Specific reagents for revealing specific structures. Table, micrographs. (M21, SS)

143-M. (Swedish.) **Metallographic Analysis and Its Application to Steel.** Sakari Heiskanen. *Jernkontorets Annaler,* v. 139, no. 2, 1955, p. 78-134.

Methods for isolating and studying carbides and nonmetallic inclusions. Graphs, diagrams, micrographs, tables. 29 ref. (M general, ST)

144-M. Investigation of Segregation in Cast Irons by Radiographic Techniques. Jerome Cohen, Eugene Hall, Laurence Leonard and Robert Ogilvie. *Nondestructive Testing,* v. 13, Mar.-Apr. 1955, p. 33-34.

Utilization of microradiography in the metallographic study of metal structures. Photographs, micrographs. (M23, CI)

145-M. (Russian.) **Structure of Superconductors. VIII. X-Ray and Metallographic Investigation of the Bismuth-Rhodium System.** N. N. Zhur-

avlev and G. S. Zhdanov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 28, no. 2, Feb. 1955, p. 228-235 + 2 plates; disc., p. 235-236.

Phase characteristics, solubilities, densities and microhardness determined for three compounds, with polymorphic modifications according to temperature. Micrographs, tables, phase diagram, graph. 15 ref. (M24, N6, P10, Q29, Bi, Rh)

146-M. Lattice Spacings of the Aluminium-Rich Solid Solution Containing Magnesium and Silicon. R. B. Hill and H. J. Axon. *Institute of Metals, Journal,* v. 83, Mar. 1955, p. 354-356.

Measurements show negative deviation from simple additivity, the magnitude of which increases with increasing alloy content of the solid solution. Graph, table. 5 ref. (M26, Al)

147-M. A Universal Polishing Method. H. S. Cannon. *Metal Progress,* v. 67, Apr. 1955, p. 83-86.

Standard procedures for using two grades of high-purity alumina polishing powder. Micrographs. (M21)

148-M. Oxidation Method for Measuring True Austenitic Grain Size. (Digest of "Perfecting the Oxidation Method to Permit Showing the True Austenitic Grain of Steels", by A. Kohn; *Revue de Metallurgie,* v. 57, Feb. 1954, p. 129-137.) *Metal Progress,* v. 67, Apr. 1955, p. 158, 160, 162.

Previously abstracted from original. See item 188-M, 1954. (M27, ST)

149-M. (German.) **The Aluminum-Silicon System.** H. Spengler. *Metall,* v. 9, nos. 5-6, Mar. 1955, p. 181-186.

Solubility of aluminum in silicon in the solid state; microstructure of eutectic aluminum-silicon alloy. Micrographs, graphs, table. 41 ref. (M27, M24, N12, Al, Si)

150-M. (German.) **The Principles of the Iron-Carbon Diagram.** P. Steidl. *Schweissen und Schneiden,* v. 7, no. 2, Feb. 1955, p. 61-66.

Structure of metals; the iron-carbon space-lattice; determination of constitution diagrams and their significance; effect of alloying elements. Diagrams, graphs, micrographs. 4 ref. (M24, Fe)

151-M. (German.) **Recent Developments on Apparatus to Prepare Polished Micro-Sections and for Metallographic Examination.** Richard Pusch. *Stahl und Eisen,* v. 75, no. 6, Mar. 24, 1955, p. 335-345.

Specimen preparation, methods of illumination, optical equipment and technique of obtaining photomicrographs. Photographs, micrographs, table, diagrams. 52 ref. (M21)

152-M. The Electron Microscope and Some of Its Industrial Applications. *Machinery (London),* v. 86, Apr. 15, 1955, p. 805-812.

Uses of the microscope in connection with metallurgical investigations. Micrographs, photographs. (M21)

153-M. (English.) **Data on Copper Oxyarsenate, Copper Nickeloxyarsenate, and Nickel Oxide Inclusions.** Z. Hegedüs. *Acta Technica Academiae Scientiarum Hungaricae,* v. 10, nos. 1-2, 1955, p. 117-126.

Optical and physical behavior; formation of nickel oxide inclusions and their distinction from other nonmetallic inclusions in copper. Micrographs, table. 5 ref. (M28, Cu, Ni)

154-M. (Dutch.) **Technique of Preparations for Metal Investigations.** W. G. R. de Jager and P. Breedveld. *Metalen,* v. 10, no. 5, Mar. 15, 1955, p. 61-65 + 6 plates.

Review of metallographic procedures. Micrographs, table. 3 ref. (M21)

155-M. (German.) **Data on Copper Oxide Inclusions in Industrial Copper.** Z. Hegedüs. *Acta Technica Academiae Scientiarum Hungaricae,* v. 10, nos. 1-2, 1955, p. 127-137.

Optical behavior and identifying characteristics; technological defects caused by the inclusion; reactions occurring during hot working. Micrographs. 3 ref. (M27, Cu)

156-M. (German.) **Process of Etching Highly Alloyed Chromium and Chromium-Nickel Steels for Revealing Austenite, Ferrite, Sigma Phase, and Carbides.** Franz Braumann and Günther Pier. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 145-151.

Effect of several etchants on above phases; selective electrochemical etching of austenite-ferrite structure. Tables, micrographs, graphs, diagram. 10 ref. (M21, AY)

157-M. (German.) **Experiences With Counting-Tube Equipment for X-Ray Microstructure Investigations and Spectrum-Emission Analysis.** Hermann Möller and Viktor Hauk. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 171-178.

Comparison of Debye-Scherrer recordings on X-ray film with counting-tube goniometer recordings; accuracy of glancing-angle determination; limit of detecting admixtures; comparison with chemical analyses of steels and iron-copper mixtures.

Tables, graphs, X-ray recordings, micrographs. 18 ref.
(M22, S11, Fe, Cu, ST)

158-M. (German.) **Chromium Alloys With Platinum, Iridium, Rhodium, and Ruthenium.** Ernst Raub and Werner Mahler. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 210-215.

X-ray and microscopic investigation of alloy formation. Crystal structure and physical properties. Tables, graphs, micrographs. 4 ref.
(M24, P general, Cr, Pt, Ir, Rh, Ru)

159-M. (German.) **Crystal Chemistry of B-Metals. III. Crystal Structure of GaSe and InTe.** Konrad Schubert, Erhard Dörre and Manfred Kluge. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 216-224.

Thorough investigation on the basis of bibliographical information and experimental data. Tables, diagram. 18 ref. (M26, In, Te, Ga, Se)

160-M. (German.) **Influence of Different Etching Agents on Germanium. I. Chemical Action of Certain Etching Agents on Germanium. II. Physical Consideration.** Oskar Rösner and Gotthold Zielasek. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p 225-233.

Action of various liquids and gases investigated, microscopically and gravimetrically, in addition to the recovery possibilities of germanium from spent etching solutions. Diagrams, tables, micrographs. 7 ref.
(M21, Ge)

161-M. (Swedish.) **Apparatus for Linear Microscopic Analysis.** G. Molinder. *Jernkontorets Annaler,* v. 139, no. 3, 1955, p. 174-181.

Apparatus for use in the study of amount of different constituents of steel, carbon content of austenite etc., after different heat treatments. Photograph, tables, graphs. 7 ref. (M21)

162-M. Electrolytic Etching. Cornelius A. Johnson. *AB Metal Digest,* v. 1, Mar. 1955, p. 3-5, 9.

An indispensable tool in many routine studies of microstructures, as well as research-type problems involving the development of specialized techniques. Graphs, photographs, diagrams, micrographs.
(M21)

163-M. Surface Examination by Reflection Electron Microscopy. J. S. Halliday. *Engineer,* v. 199, Apr. 22, 1955, p. 569-573.

Advantages of reflection electron microscopy over other methods of surface examination. Micrographs, diagrams, table. (M21)

164-M. The System Uranium-Tungsten. D. Summers-Smith. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 383-384.

Solubility of uranium in tungsten and that of tungsten in uranium were investigated in arc-melted alloys by X-rays, dilatometry and metallography. Tables. 6 ref.
(M24, N12, U, W)

165-M. (English.) **Dislocation Networks in Crystals.** Taira Suzuki and Hideji Suzuki. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 573-596.

Space arrangements of networks have certain intimate connection with their persistence in crystals. Diagrams, graphs, table. 40 ref.
(M26)

166-M. (Book.) **Applied X-Rays.** George L. Clark. International Series in Pure and Applied Physics. 4th Ed. 843 p. 1955. McGraw-Hill Book Company, New York, N. Y. $12.50.

General physics and applications of X-radiation. X-ray analysis of the ultimate structures of materials.
(M22, S11)

167-M. (Book.) **X-Ray Diffraction by Polycrystalline Materials.** H. S. Peiser, H. P. Rooksby, and A. J. C. Wilson, editors. Physics in Industry Series. 725 p. 1955. Institute of Physics, 47 Belgrave Square, London, S.W. 1, England. 63s.

Experimental techniques, interpretation of data, and practical uses of techniques in different fields.
(M22)

168-M. Metallographic Polishing of Cast Iron. L. E. Samuels. *Iron and Steel Institute, Journal,* v. 180, May 1955, p. 23-25 + 2 plates.

Modification of a general method of metallographic polishing based on the use of diamond abrasives. Micrographs. 8 ref. (M21, CI)

169-M. A High-Resolution Metallograph for Elevated Temperatures. J. E. Jenkins, D. R. Buchele and R. A. Long. *Metal Progress,* v. 67, May 1955, p. 101-104.

Microscope hot stage and special objective of reflecting elements with a long working distance and a high numerical aperture to give maximum resolving power. Changes in microstructure photographed with movie camera. Photograph, diagrams, micrographs. (M21)

170-M. A Microscope Hot Stage. H. A. Saller, R. F. Dickerson and R. J. Carlson. *Metal Progress,* v. 67, May 1955, p. 105-108.

Compact unit for studying structural changes in metals at temperatures up to 1800° F. Covers vacuum furnace, optical group, cold trap and vacuum system. Diagram, photograph, micrographs. (M21)

171-M. Structure of the ω-Precipitate in Titanium-16 Per Cent Vanadium Alloy. J. M. Silcock, M. H. Davies and H. K. Hardy. *Nature,* v. 175, Apr. 23, 1955, p. 731.

Relation between beta and omega titanium as shown by study in molybdenum K-alpha radiation. X-ray diffractogram, diagram. 4 ref. (M26, Ti, V)

172-M. (French.) **Anodic Attack, Especially Suited to the Electron Micrography of 80-20 Nickel-Chromium-Type Alloys Susceptible to Hot Tough Structural Hardening.** Yves Baillie and Pierre Gilles. *Comptes rendus,* v. 240, no. 13, Mar. 28, 1955, p. 1430-1432.

Metallographic preparation of Nimonic alloys is improved by using an anodic attack with hydrofluoric acid. Micrographs. 5 ref. (M21, Ni, Cr)

173-M. (Russian.) **X-Ray Investigation of Initial Stages of the Breakdown of a Supersaturated Solution of a Delta Solid Solution of Silver-Aluminum.** A. M. Elistratov. *Doklady Akademii Nauk SSSR,* v. 101, no. 3, Mar. 21, 1955, p. 473-476 + 1 plate.

Experimental data about structural changes in crystals of a supersaturated solid solution of silver in aluminum (delta-phase); three stages involved; gamma-phase. Diffraction patterns. 10 ref. (M26, Ag, Al)

174-M. (Russian.) **Problem of Mosaic Texture in Semicrystalline Metals.** V. I. Iveronova and A. A. Katsnel'son. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 696-699.

Studies on iron-palladium and iron-cobalt alloys at various temperatures and durations of tempering. Graphs. 6 ref. (M26, Fe, Pd, Co)

175-M. The Compound Na_9Pb_4. Ivar T. Krohn, R. C. Werner and Hymin Shapiro. *American Chemical Society, Journal,* v. 77, Apr. 20, 1955, p. 2110-2113.

Sodium-lead equilibrium diagram restudied by thermal and microscopic analysis. Table, phase diagram. 14 ref. (M24, Na, Pb)

176-M. Quantitative Use of X-Ray Diffraction for Analysis of Iron Oxides in Gogebic Taconite of Wisconsin. R. S. Shoemaker and D. L. Harris. *Mining Engineering,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 202, May 1955, p. 476-480.

X-ray diffraction procedures; applications to beneficiation studies. Diagram, tables, graphs. 13 ref. (M22, B14, Fe)

177-M. The System Niobium-Silicon and the Effect of Carbon on the Structures of Certain Silicides. A. G. Knapton. *Nature,* v. 175, Apr. 23, 1955, p. 730.

Phase diagram of the niobium-silicon system determined by melting-point determinations. X-ray examination and metallography. (M24, Nb, Si)

178-M. (German.) **Manganese Alloys With Platinum, Iridium, Rhodium, and Ruthenium.** Ernst Raub and Werner Mahler. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 282-290.

X-ray and metallographic investigations of binary systems. Constitution diagrams, tables, micrographs. 18 ref. (M24, Mn)

179-M. (German.) **Constitution of the Binary Systems: Gallium-Antimony, Gallium-Arsenic, and Aluminum-Arsenic.** Werner Köster and Berthold Thoma. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 291-293.

Analysis of constitution diagrams. Graphs, micrographs. 7 ref. (M24, Ga, Sb, Al, As)

180-M. (German.) **Constitution of the Ternary System of the Metals of the Third and Fifth Groups of the Periodic System.** Werner Köster and Berthold Thoma. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 293-297.

Constitutional diagrams of the systems: aluminum-gallium-antimony, aluminum-indium-antimony, and gallium-indium-antimony. Micrographic study of the systems. Diagrams, micrographs, graphs. 7 ref. (M24, Al, Ga, In, Sb)

181-M. (Hungarian.) **Preparation of Cast Iron for Microscopic Investigation.** Ferenc Boda. *Ontode,* v. 6, no. 4, Apr. 1955, p. 91-96.

Review of various processes; methods for decreasing time for specimen preparation; author's rapid polishing process. Micrographs. 9 ref. (M21, CI)

182-M. (Russian.) **Mechanism of the Effect of Alternating Current on the Structure of Copper Deposits.** K. M. Gorbunova and A. A. Sutiagina. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 3, Mar. 1955, p. 542-546.

Depending on amplitude, applica-

tion of alternating current causes a smoothing of the surface of the deposit and the formation of friable, flocculent fine-crystal deposits. Oscillograms, micrographs. 9 ref. (M26, Cu)

183-M. An X-Ray Study of the System Uranium Monocarbide-Uranium Dicarbide-Beryllium Carbide. M. D. Burdick, H. S. Parker, R. S. Roth and E. L. McGandy. *Journal of Research, National Bureau of Standards,* v. 54, Apr. 1955, p. 217-229.

X-ray diffraction methods applied to study of system heated to 1700° C. and quenched. Room-temperature stability of uranium sesquicarbide is verified. Tables, graphs, diagram, phase diagrams. 21 ref. (M24, M22, Be, U)

184-M. Factors Affecting Microcharacter of Metal Surfaces. (Digest of "Changes in Metallic Surfaces Produced by Chemical Processes and by Heating", by S. Z. Roginskii, I. I. Tret'yakov and A. B. Shekhter; *Doklady Akademii Nauk SSSR,* v. 91, 1953 p. 1167-1169.) *Metal Progress,* v. 67, June 1955, p. 202, 204, 206.

Previously abstracted from original. See item 41-M, 1954. (M21)

185-M. Brillouin Zones of Some Intermetallic Compounds. P. J. Black. *Philosophical Magazine,* v. 46, 7th ser., no. 375, Apr. 1955, p. 401-409.

Data for nine aluminum-rich compounds of iron obtained by X-ray analysis. Tables. 23 ref. (M22, Al)

186-M. A New Treatment of Anharmonicity in Lattice Thermodynamics. I—II. D. J. Hooton. *Philosophical Magazine,* v. 46, 7th ser., no. 375, Apr. 1955, p. 422-442.

Approximate solution of anharmonic vibrational motion of atoms in a crystal. 7 ref. (M25)

187-M. Interaction of Dislocations and F-Centres in Sodium Chloride Single Crystals. S. Amelinckx, W. Van der Vorst, R. Gevers and W. Dekeyser. *Philosophical Magazine,* v. 46, 7th ser., no. 375 Apr. 1955, p. 450-451 + 1 plate.

Studies indicate that dislocation networks may act as precipitation zones. Photographs. 4 ref. (M26)

188-M. (English.) **Growth of Cadmium Iodide Crystals.** John B. Newkirk. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 121-125 + 1 plate.

Microscopic studies of step-by-step crystal formation and growth. Photographs, micrographs, diagrams, graph. 3 ref. (M26, N12, Cd)

189-M. (English.) **The Segregation of Carbon in Iron Single Crystals as Studied by Torsion Pendulum Damping.** F. W. Kunz. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 126-129.

Series of experiments on the effect of quenching and straining on the segregation of carbon in single crystals of alpha-iron. Graph. 8 ref. (M26, Fe)

190-M. (English.) **Frictional Forces on Dislocation Arrays at the Lower Yield Point in Iron.** A. Cracknell and N. J. Petch. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 186-189.

A linear relationship is calculated between sigma and the concentration of carbon + nitrogen in solution. This is confirmed by experimental measurements. Table, graphs. 16 ref. (M26, Fe)

191-M. (English.) **X-Ray Line Broadening From Cold-Worked Iron.** R. I. Garrod and J. H. Auld. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 190-198.

Measurements from cold-worked iron filings, and from wire specimens prestressed by uni-axial tension to various stages in the plastic range, analyzed in terms of both line breadths and line shapes for a number of high angle reflections. Diagram, tables, graphs. 28 ref. (M22, Fe)

192-M. (French.) **Determination of Sub-Structures in Metal Single Crystals by Means of X-Rays.** H. Lambot, L. Vassamillet and J. Dejace. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 150-156.

Method is capable of revealing essentially perfect sub-grains whose size is of the order of tens of microns and whose mutual disorientation is at least of the order of 1 min. of arc. Photographs. 28 ref. (M26, M22)

193-M. (French.) **Indication of the Presence of Structural Imperfections in the "Sub-Grains" in Metal Crystals.** Aurel Berghezan and Jean Hérenguel. *Comptes rendus,* v. 240, no. 14, Apr. 4, 1955, p. 1536-1537.

Micrographic study of arrangement of the substructure of monocrystals of strongly cold worked aluminum with 3% magnesium in solid homogeneous solution and its evolution during annealing at low temperature. 3 ref. (M27, Al)

194-M. (Russian.) **Effect of the Form of Pearlite and of Ferrite Grain Size on the Properties of Steel Castings.** M. M. Kantor and N. M. Serpik. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 19-21.

Effect of various heat treatments on strength and structure. Micrographs, tables, graph. 2 ref. (M27, N8, Q general, CI)

195-M. (Book.) **Electrons, Atoms, Metals and Alloys.** William Hume-Rothery. Rev. Ed. 387 p. 1955. Philosophical Library, 15 East 40th Street, New York 16, N. Y. $3.75.

Structure of atoms and nuclei; atomic structure of metals and alloys. Electronic basis of physical properties. (M25)

196-M. The Crystal Structures of RhTe and $RhTe_2$. S. Geller. *American Chemical Society, Journal,* v. 77, May 5, 1955, p. 2641-2644.

Structures determined from X-ray powder diffraction data. Tables. 11 ref. (M26, Rh, Te)

197-M. The Distribution of Dislocations in Linear Arrays. A. K. Head and N. Louat. *Australian Journal of Physics,* v. 8, Mar. 1955, p. 1-7.

An approximate method for finding equilibrium distribution of arrays of dislocations. Analysis based on the assumption that an array of discrete dislocations may be replaced by a continuous distribution of smeared dislocations. (M26)

198-M. (French.) **On the Detection of the Polygonization by the Diffraction of X-Rays.** A. R. Weill. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 294-306.

X-ray methods for recognizing the polygonization of metals and alloys, either induced at the laboratory or spontaneously formed during industrial processing. Photographs. 20 ref. (M22)

199-M. (Polish.) **Electrolytic Polishing of Large Metallographic Specimens.** J. Ogerman. *Hutnik,* v. 22, no. 3, Mar. 1955; *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa,* v. 6, no. 3, 1955, p. 9-10.

Specimens of steels of 6 to 15 sq. c.m. area were polished with consideration given to temperature, current density and polishing time; comparison of electrolytic and mechanical polishing. Micrographs, table. (M21, ST)

200-M. (Russian.) **Effect of Treatment on Bond Strengths in Crystals of an α-Solid Solution of an Iron-Nickel Alloy.** V. K. Kritskaia, G. V. Kurdiumov and L. V. Tikhonov. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 271-274.

Effect of heat treatment (quenching and tempering) and of plastic deformation; X-ray study of filings; character of distribution and redistribution of atoms, bond strength in the lattices. Graph, table. 14 ref. (M26, Q24, J general, Fe, Ni)

201-M. (Russian.) **Study of Some Cases of Block Formation in Aluminum and the Role of Impurities in the Delineability of the Blocks.** I. E. Bolotov, Iu. D. Kozmanov and A. N. Timofeev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 887-896.

Study of the polygonization of distorted single crystals and of the mosaic structure of single crystals that have undergone thermal fatigue. Micrographs. 15 ref. (M26, Q24, Al)

202-M. X-Ray Diffraction and Spectrographic Analysis. Ursula M. Martius. *Canadian Metals,* v. 18, June 1955, p. 22, 24, 26.

Principle features of X-ray diffraction and spectroscopy; practical problems which may be solved by means of these techniques. Photograph, graph. (M22, S11)

203-M. Metallurgy and Microradiography. I. Theory. R. Urlocker, J. W. Rutter, and W. C. Winegard. *Canadian Metals,* v. 18, June 1955, p. 28, 30, 32.

Microradiography supplements the investigation procedures of microporosity; presence and identification of inclusions; distribution, shape and particle size of a second phase; concentration gradients which may exist in certain regions. Diagram, photograph, micrographs. 5 ref. (M23)

204-M Thermionic Emission Microscopy of Metals. I. General. R. D. Heidenreich. *Journal of Applied Physics,* v. 26, June 1955, p. 757-765.

An electrostatic emission microscope operating with an accelerating voltage of 10-25 kilovolt described; factors determining image quality, particularly contrast and resolution; interpretation of images on the basis of the Schottky emission equation. Diagrams, tables, micrographs. 15 ref. (M21)

205-M. Intermediate Phases in the Cr-Mo-Co System at 1300° C. J. B. Darby, Jr., and P. A. Beck. *Journal of Metals, v. 7; American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, June 1955, p. 765-766.

Study of the Cr-Mo-Co ternary system and some notes on the new ternary phase, D, of unkown and apparently complex crystal structure. Diagrams, table. 2 ref. (M24, M26, Cr, Co, Mo)

206-M. A High-Temperature, X-Ray Diffraction, Powder Camera. E. Matuyama. *Journal of Scientific Instruments,* v. 32, June 1955, p. 229-231.

High-temperature Debye-Scherrer camera fitted with a small carbon-tube furnace is capable of attaining temperatures as high as 1800° C. Diagrams, graph. 5 ref. (M22)

207-M. Technique of Microautoradiography for Metal Specimens. Robert C. Plumb. *Review of Scientific Instruments,* v. 26, May 1955, p. 489-493.

It is capable of producing a resolution of at least nine microns with X-radiation and supplying quantitative information as to the distribution of radio-active material in a metallurgical structure. Diagrams, micrographs. 11 ref. (M23)

208-M. Electronic Vacuum Dilatometer. M. E. Dooley and D. F. Atkins. *Review of Scientific Instruments,* v. 26, June 1955, p. 568-571.

Apparatus and advantages. Several curves illustrate performance of the instrument. Diagrams, graphs. 5 ref. (M23)

209-M. Dislocations in Metals. Frank B. Cuff, Jr., and L. McD. Schetky. *Scientific American,* v. 193, July 1955, p. 80-87.

Many important properties of metals are now understood to result from a kind of imperfection in crystal lattices that is called a dislocation. A large group of properties which previously could be studied only in an empirical way are now being rationally analyzed. Photographs, diagrams. (M26)

210-M. Nature of Hexagonal Chromium and the Structure of Electrodeposited Chromium. S. A. Nemnonov. *Henry Brutcher Translation No.* 3493, 13 p. (Abridged from *Zhurnal Tekhnicheskoi Fiziki,* v. 18, no. 2, 1948, p. 239-246.) Henry Brutcher, Altadena, Calif.

Stages of formation of cubic chromium under ordinary conditions of deposition; effect of temperature and current density. 26 ref. (M27, L17, Cr)

211-M. The Sigma Phase in 18-8 Austenitic Steel Welds. B. I. Medovar and A. A. Rossoshinskii. *Henry Brutcher Translation No.* 3516, 16 p. (Abridged from *Avtomaticheskaya Svarka,* v. 7, no. 3, 1954, p. 26-40.) Henry Brutcher, Altadena, Calif.

Conditions for formation and methods of rendering visible brittle structural constituents, known as the sigma phase, in automatic welds made with chromium-nickel austenitic steel filler metal. Tables, graphs, photograph, micrographs. 17 ref. (M27, K1, SS)

212-M. (Czech.) **Electron Diffraction Method and Its Use in Metallography, Especially in the Metallography of Steel.** Frantisek Kralik. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 262-266.

Method used to study the structure of fracture surfaces and structural changes during secondary steel hardening. Micrographs. 10 ref. (M22, ST)

213-M. (French.) **Prohibited and Permitted Bands in Impure Semiconductors and Disordered Alloys.** J. des Cloizeaux. *Journal de physique et le radium,* v. 16, no. 4, Apr. 1955, p. 320-324.

Limits of permitted energy bands in a unidimensional semiconductor model or model of a disordered alloy, the latter representing a problematical succession of two types of cells. Graph, diagrams. 7 ref. (M26)

214-M. (French.) **Iron Content and Size of Grains in an Annealed Zinc Alloy With 0.3% Pb and 0.3% Cd.** L. Boschi, H. Destaillats, J. Sabato, J. Walls and A. Varsavski. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 105-107.

Influence of iron impurity on grain size; new technique for measuring grain size without using polarized light. Tables, graph, micrographs. 6 ref. (M27, Zn)

215-M. (Pamphlet.) **High-Resolution Autoradiography for Study of Grain Boundaries in Metals.** PB 111558. 82 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $2.25.

Metallurgical phenomena studied include diffusion, gases in metals, effect of heat treatment on mode of distribution of a minute phase, and the modifying effects of trace quantities of an element on the formation of a second constituent. (M23, M27)

216-M. (Book.) **Neutron Diffraction.** G. E. Bacon. Monographs on the Physics and Chemistry of Materials. 299 p. 1955. Oxford University Press, Amen House, London E.C. 4, England. 35s.

Experimental techniques. Investigations of magnetic materials and alloys. (M22, SG-p)

217-M. Metallurgy and Microradiography. II. R. Urlocker, J. W. Rutter and W. C. Winegard. *Canadian*

Metals, v. 18, July 1955, p. 20-21, 23.
Experimental application of the technique to obtain microradiographs. Micrographs. 6 ref. (M23)

218-M. Metals, Perfect and Imperfect. T. E. Allibone. *Foundry Trade Journal,* v. 98, June 23, 1955, p. 667-675.
Review of the development of our knowledge of metallic crystals and indication of the direction from which further advances are likely to come. Diagrams, photographs, micrographs, graphs. 23 ref. (M26)

219-M. A Three-Dimensional Face-Centred Cubic Model for the Study of Crystal Phenomena. P. R. Rowland. *Institute of Metals, Journal,* v. 83, June 1955, p. 455-459 + 1 plate.
The model, containing 10^3 to 10^4 lattice units, is rapidly and accurately assembled by pouring steel ball bearings into a suitable transparent mold. Manipulation of the model has revealed a hitherto unsuspected lattice transformation, which results in the production of two new face-centered lattices bearing a twin relationship to each other but not to the original lattice. Diagrams, photographs, micrograph. 3 ref. (M26, N6, Cu)

220-M. Apparatus for Studying Irradiated Liquid Metals. R. J. Teitel. *Nucleonics,* v. 13, July 1955, p. 50-51.
Effect of irradiation on microstructure of liquid-metal fuels for power reactors. Photographs, micrographs. 1 ref.
(M27, Pb, Sn, Bi, U)

221-M. (English.) **On the Structure of Evaporated Thin Films of Metals.** Shiro Ogawa, Denjiro Watanabe and F. Eiichi Fujita. *Physical Society of Japan, Journal,* v. 10, no. 6, June 1955, p. 429-436.
Study of thickness, area, and repeat frequency of twinned layers by means of electron microscope. Micrographs, diagrams. 11 ref.
(M27, N15)

222-M. (English.) **On the Amorphous State of the Binary System of Nickel-Sulfur.** Masao Sawada, Kenjiro Tsutsumi, Toshio Shiraiwa and Masayoshi Obashi. *Physical Society of Japan, Journal* v. 10, no. 6, June 1955, p. 459-463.
Investigation and results of the measurements of the electrical resistances and crystal structures of this system. Table, diagrams, photographs, graphs. 5 ref.
(M24, M26, Ni)

223-M. (French.) **Influence of the Chemical Composition of Silicate Inclusions on the Properties of Gray Irons.** André Roos. *Fonderie,* 1955, no. 111, Apr., p. 4465-4473.
Aceto-cupric method of determining silica inclusions in gray irons. Diagram, photographs, graphs, micrographs, tables. 10 ref. (M28, CI)

224-M. (French.) **Electron-Diffraction Study of the Composition of Oxidation Films on Iron and Different Binary Alloys.** J. Moreau and J. Bénard. *Institut de Recherches de la Sidérurgie, Publications,* ser. A, no. 109, May 1955, 26 pages + 12 plates.
Nature of the phases of oxidation films on iron and iron-nickel, iron-chromium and nickel-chromium alloys; development of structure and texture of these phases during oxidation. Tables, diagrams, micrographs. (M22, M26, Fe, Cr, Ni)

225-M. (German.) **Iron-Cobalt-Vanadium Ternary System. I. Formation of the Ternary System in Case of Inhibited Alpha-Gamma Transformation.** Werner Köster and Heinz Schmid. *Archiv für das Eisenhüttenwesen,* v. 26, no. 6, June 1955, p. 345-353.
Thermal, dilatometric, magnetic, microscopic and X-ray investigations for determination of constitution diagram. Diagrams, graphs, micrographs. 26 ref.
(M24, Co, Fe, V)

226-M. (German.) **Structure Invsetigation of Multiple-Component Systems by Kinetic Electron Diffraction.** Alfred Boettcher, Günter Haase and Rudolf Thun. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 386-400.
Continuous recording of electron-diffraction diagrams requiring wedge-shaped specimens prepared by a special vapor-deposition process; preparation of specimens and the recording camera; interpretation of electron-diffraction photographs of silver-tin, gold-tin, silver-lead-tin, and silver-antimony alloys. Graphs, diagrams, micrographs. 34 ref.
(M22)

227-M. (Russian.) **Position of Copper and Magnesium Atoms in the Structure of CuMgSn.** E. I. Gladyshevskii and P. I. Kripiakevich. *Doklady Akademii Nauk SSSR,* v. 102, no. 4, June 1, 1955.
Crystallographic study of ternary intermetallic compound CuMgSn. Tables, diagrams. 6 ref.
(M26, Cu, Mg, Sn)

228-M. (Russian.) **Development of Binary Alloy Phase Diagrams in Connection With the Interaction Between Particles of Alloyable Elements.** T.

Lebedev. *Zhurnal Obshchei Khimii,* v. 25, no. 5, May 1955, p. 898-902.

Provides new systematization where gradiations of the combinations of elements and transition of these gradations from one type to another are indicated. Diagrams. 5 ref. (M24)

229-M. Relaxations in the Attenuation of Single Crystal Lead at Low Temperatures and Their Relation to Dislocation Theory. W. P. Mason. *Acoustical Society of America, Journal,* v. 27, July 1955, p. 643-653.

Measured results correlate well with a relaxation due to the displacement of a dislocation from one atomic line to an adjacent one against the limiting shearing stress of the crystal. Graphs, diagrams. 15 ref. (M26, Pb)

230-M. The Equilibrium Diagram of the System Nickel-Titanium. D. M. Poole and W. Hume-Rothery. *Institute of Metals, Journal,* v. 83, July 1955, p. 473-480.

Investigation of the system above 900° C. by thermal, microscopical and X-ray methods. Tables, diagrams. 18 ref. (M24, Ni, Ti)

231-M. Equilibrium Relations at 460° C. in Aluminium-Rich Alloys Containing 0-7% Copper, 0-7% Magnesium, and 2.0% Silicon. H. J. Axon. *Institute of Metals, Journal,* v. 83, July 1955, p. 490-492.

Additional information about the 2.0% silicon section, reliability with which a solid model of the aluminum-rich corner of the quaternary isothermal model may be constructed. Diagrams, table. 3 ref. (M24, Al, Cu, Mg, Si)

232-M. Foreign Atoms in Metals. J. D. Fast. *Philips Technical Review,* v. 16, June 1955, p. 341-351.

Influence of interstitial atoms in metals and their effect on hardness and brittleness. Diagrams, graphs. 14 ref. (M25, Q23, Q29)

233-M. Solution of the Hartree-Fock-Slater Equations for Silicon Crystal by the Method of Orthogonalized Plane Waves. Truman O. Woodruff. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1741-1742.

Orthogonalized plane wave (OPW) method is used to compute estimates of the energy eigenvalues associated with states for which $k = 0$ in the valence and conduction bands of a perfect silicon crystal. Table. 5 ref. (M26, Si)

234-M. Lattice Resistance to Dislocation Motion at High Velocity. Edward W. Hart. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1775-1776.

Dissipative effects at high velocities, resulting from coherent collisions of dislocations with the lattice sites, were estimated and found to be too small to limit the dislocation velocity. 7 ref. (M26)

235-M. Metallography of Beryllium and Beryllium-Rich Alloys. Murray C. Udy. Paper from "The Metal Beryllium". American Society for Metals, p. 505-529.

Development and modification of various techniques used in the microscopic examination of the metals. A generally useful scheme is presented and the procedures of individual laboratories compared in tabular form. Tables, micrographs. 15 ref. (M21, Be)

236-M. (English.) **Bravais' and Kossel-Stranski's Theories of Homopolar Crystals and Their Application to Elements.** Gösta Wranglén. *Acta Chemica Scandinavica,* v. 9, no. 4, 1955, p. 661-676.

Correlation of lattice structure to crystal habit or external face development. Tables diagrams. 34 ref. (M26)

237-M. (English.) **Dislocations in Low-Angle Boundaries in Germanium.** F. L. Vogel, Jr. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 245-248.

X-ray and microscopic studies show correlation between dislocation spacings in the boundary and observed pit spacing. Graphs, diagrams, photograph, micrographs. 10 ref. (M26, Ge)

238-M. (English.) **Structure and Polygonization of Bent Zinc Monocrystals.** John J. Gilman. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 277-288.

Crystallography and distribution of dislocations in freshly bent crystals, kinetics of polygonization. Graphs, diagrams, photographs, micrographs. 27 ref. (M26, Q24, Zn)

239-M. (Englsh.) **Crystal Perfection in Aluminum Single Crystals.** T. S. Noggle and J. S. Koehler. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 260-267.

A high-resolution X-ray diffraction technique used on annealed single crystals of aluminum to estimate dislocation densities and distributions. Tables, graphs, diagrams. 9 ref. (M26, Al)

240-M. (English.) **The Deformation of Single Crystals of Alpha-Brass.** Heather M. Murphy and E. A. Calnan. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 268-273.

Single crystals, deformed in ten-

sion, studied by X-ray and micrographic methods. Shows connection between the orientation dependence of cross-slip and the unequal hardening of active and latent slip planes. Tables, graphs, diagrams, micrographs. 15 ref. (M26, Q24, Cu)

241-M. (German.) **Determination of the Dislocation Density in Deformed Iron.** W. Köster and L. Bangert. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 274-276.

In iron, containing carbon and nitrogen, damping-temperature curves were investigated in relation to foreign atoms in solid solution and the degree of cold working. Tables, graphs. 12 ref. (M26, Q24, Fe)

242-M. (English.) **The Origin of Screw Dislocations—Role of Colloidal Particles.** G. W. Sears. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 299-300.

Compares work on cadmium iodide platelets from solution and para-toluidine platelets from vapor. Mentions new work with colloidal-free cadmium iodide crystals. 4 ref. (M26, Cd)

243-M. (English.) **On the Formation of Dislocation Networks in Some Crystal Lattices.** Francisco Eiichi Fujita. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 1, Feb. 1955, p. 50-55.

Growth and mutual connection of the dislocation rings and eventual formation of networks geometrically discussed in reference to a face-centered cubic lattice. Diagrams, tables. 6 ref. (M26)

244-M. (English.) **The Light-Figure Phenomenon Revealed and Crystal Planes Developed by Etching in Tetragonal Tin Crystals and the Determination of Their Crystal Orientations by the Light-Figure Method. I. The Light-Figure Phenomenon Revealed and Crystal Planes Developed by Etching. II. Orientation Determination by Light Figures.** Mikio Yamamoto and Jiro Watanabe. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 2, Apr. 1955, p. 145-172.

The light figures revealed by and crystal planes developed in single crystals of tetragonal tin, etched with various concentrated aqueous solutions of acids, alkalis or salts for various time-intervals, studied and suitability of observed light figures for the orientation determination examined. Application of light figures to the orientation determination of single crystal rods of tetragonal tin. Tables, diagrams, photographs. 23 ref. (M26, Sn)

245-M. (English.) **Further Studies on the Orientation Determination of Cubic Metal Crystal Rods by the Light-Figure Method.** Mikio Yamamoto and Jiro Watanabe. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 2, Apr. 1955, p. 173-183.

Factors affecting the precision, accurately determinable ranges of orientation angles and kind and number of applicable light figures or of accurately determinable angles fully explained. Tables, diagrams. 9 ref. (M26)

246-M. (English.) **Electron Diffraction Study on Titanium Attacked by Various Acids.** Shiro Ogawa and Denjiro Watanabe. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 2, Apr. 1955, p. 184-193.

Titanium surfaces attacked by hydrofluoric acid, hydrochloric acid, sulfuric acid, phosphoric acid, nitric acid, aqua regia, chromic acid, sodium chloride solution or ferric chloride solution examined by reflection method. Tables, diagrams, photographs. 8 ref. (M22, R5, Ti)

247-M. (English.) **Slow Motion of Dislocation in Face-Centered Cubic Crystal.** Hideji Suzuki. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 2, Apr. 1955, p. 194-203.

Calculation of the mechanism of microcreep on basis of the chemical interaction mechanism. Diagrams, graphs. 10 ref. (M26)

248-M. (Czech.) **Effect of Tantalum Carbide and Niobium Carbide Additions on Properties of Sintered Carbides.** Curt Agte and Vladimir Dufek. *Hutnické Listy,* v. 10, no. 6, June 1955, p. 322-329.

Effect of small additions upon properties of tungsten carbide-cobalt and tungsten carbide-titanium carbide-cobalt systems. Grain refining effect of low additions (up to 2%) to the tungsten carbide-cobalt system and increase of hardness indicated. Graphs, micrographs. 18 ref. (M27, Q29, Co, Nb, Ta, W)

249-M. (French.) **Evolution of the Structure of a Modified Hot Tough 80-20 Nickel-Chromium Type Alloy.** Jack Manenc. *Comptes rendus,* v. 240, no. 25, June 20, 1955, p. 2413-2415.

Describes appearance of "satellite rays" on Debye-Scherrer diagrams during X-ray investigation of the structure of alloy during first stages of tempering. Table. 3 ref. (M26, J29, Ni, Cr)

250-M. (German.) **The Ability of Zinc to Form Alloys With Tungsten and**

Molybdenum. Werner Köster and Heinz Schmid. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 462-463.

Reaction of zinc with tungsten and molybdenum in the region of 1100 to 1350° C. Tungsten-zinc and molybdenum-zinc systems and analysis of the component crystal structures. Micrographs. 3 ref. (M24, Mo, W, Zn)

251-M. (German.) **Formation of Binary and Complex Systems of B-Metals. I. The System of Gallium With B-Metals.** Heinz Spengler. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 464-467.

Gallium-thallium system, binary, ternary, quaternary and polynary systems of gallium with B-metals. Tables, diagrams. 10 ref. (M24, Ga)

252-M. (German.) **Constitutional Diagram of Beta-Phase in the Cobalt-Zinc System.** Werner Köster and Heinz Schmid. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 468-469.

Magnetometric determination of saturation curve of the beta-1 phase for cobalt. Table, phase diagram, micrograph. 2 ref. (M24, Co, Zn)

253-M. A Study of the Titanium-Germanium System in the Region 0-11 Atomic Per Cent. Germanium. M. K. McQuillan. *Institute of Metals, Journal,* v. 83, July 1955, p. 485-489 + 1 plate.

Germanium is found to cause a slight elevation of the transformation temperature of titanium, a peritectoid reaction in which β-titanium reacts with Ti_5Ge_3 to form α-titanium occurring at approximately 897° C. Table, micrographs, graphs. 7 ref. (M24, Ge, Ti)

254-M. A Contribution to the Vanadium-Oxygen Phase Diagram. W. Rostoker and A. S. Yamamoto. *American Society for Metals, Transactions,* v. 47, p. 1002-1017.

A partial diagram in the range 0-26 wt. % oxygen was constructed on the basis of metallographic, X-ray diffraction and resistometric studies; characteristic features cited. Tables, graphs, micrographs. 9 ref. (M24, V)

255-M. Transformation Studies in Iron-Carbon-Titanium-Vanadium Alloys and the Distribution of Carbon Between These Elements. Moss V. Davis and W. P. Fishel. Paper from *"American Society for Metals, Transactions",* v. XLVII, p. 605-610.

Vanadium and titanium uncombined with carbon gave transformation temperatures which fit the binary iron-vanadium diagram and the ternary iron-vanadium-titanium diagram. Tables, graphs. 2 ref. (M24, Fe)

256-M. Etching of Steels by Ionic Bombardment. I. N. Prilezhaeva, G. V. Spivak and M. I. Malkina. *Henry Brutcher Translation No.* 3459, 8 p. (Abridged from *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 11, 1954, p 2090-2096.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 56-M, 1954. (M21, AY, SS)

257-M. The Chemical Nature of the Sigma Phase in the Iron-Chromium System. A. T. Grigor'ev, N. M. Gruzdeva and I. A. Bondar. *Henry Brutcher Translation No.* 3454, 13 p. (Condensed from *Izvestiya Sektora Fiziko-Khimicheskogo Analiza,* v. 21, 1954, p. 132-143.) Henry Brutcher, Altadena, Calif.

Nature of sigma phase in the light of hardness measurements. Correlation of results of present research with literature (chiefly Russian). Tables, diagrams, micrographs. 7 ref. (M26, Cr, Fe)

258-M. (English.) **Interfaces Between Crystals.** Cyril Stanley Smith. Paper from "L'état solide". Institut International de Physique Solvay, p. 11-44; disc., p. 45-53.

Properties of grain boundaries, variation of grain boundary energy with orientation, composition changes at single phase crystal interfaces. Micrographs, diagrams, tables, graphs. 44 ref. (M26)

259-M. (English.) **Crystal Growth and Dislocations.** F. C. Frank. Paper from "L'état solide". Institut International de Physique Solvay, p. 315-335; disc., p. 336-343.

Theories, surface nucleation, growth spiral interactions. Diagrams, graphs, micrographs. 26 ref. (M26, N12)

260-M. (English.) **On the Generation of Vacancies by Moving Dislocations.** Frederick Seitz. Paper from "L'état solide". Institut International de Physique Solvay, p. 377-407; disc., p. 408-413.

Mode of generation and densities of generated vacancies, mobility of vacancies and pairs. Influence of cold work on rate of precipitation. Diagrams, graphs. 34 ref. (M26, N7)

261-M. (English.) **Dislocation Models of Grain Boundaries.** W. Shockley. Paper from "L'état solide". Institut International de Physique Solvay, p. 431-484; disc., p. 485.

Origin of grain boundary energy, cold work effects. Diagrams, tables, graphs. 28 ref. (M27, M26)

262-M. (French.) **Periodicity Defects in the Networks of Solid Solutions.**

A. Guinier. Paper from "L'état solide". Institut International de Physique Solvay, p. 197-230; disc., p. 231-233.

Applications of X-rays to the study of the disorder of structures of mixed crystals. Graphs, diagrams, tables. 38 ref. (M26, N10)

263-M. (German.) **Discussion of the Theory of Dislocation.** U. Dehlinger. Paper from "L'état solide". Institut International de Physique Solvay, p. 415-419; disc., p. 420-425.

Critical analysis of the theory. Diagrams. 5 ref. (M26)

264-M. An Electron Diffraction Study to Determine the Oxide Form Produced in Oxidized Molten Iron. Nobutaro Kayama. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 6-8.

In the oxidized iron, SiO_2, as an inclusion, increased up to about 0.05%, although iron oxide did not increase more than 0.02%. The silica was present as alpha-crystobalite in free state, and not a component of a silicate. Tables, diffraction patterns. 2 ref. (M27, CI)

265-M. Research on the Aluminium-Silicon-Zinc System Alloys for Castings. IV. Shigeo Oya. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 27-30.

Effects of minor amounts of alloying constituents on microstructure and tensile strength. Tables, graphs, micrographs. (M27, Q23, Al)

266-M. The Principal Design and Construction Features of a Recent X-Ray Diffraction Unit. R. I. Garrod, C. M. Chamberlain and K. A. Gross. *Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Report* 210, Dec. 1954, 16 p. + 3 plates.

Principal design factors that have been taken into consideration and construction and performance of the unit. Photographs, diagrams. 9 ref. (M22)

267-M. An Investigation of the General Metallurgy of Aluminum-Base Aircraft Alloys. Walter F. Heller and James M. Thompson. *General Motors Engineering Journal,* v. 2, July-Aug. 1955, p. 26-30.

Effects of underheating and overheating on microstructures of the various alloys and effects of the different thermal and aging treatments used. Tables, micrographs. (M27, J general, Al)

268-M. A Spectrometer for Single Crystal Neutron Diffraction. G. E. Bacon and R. F. Dyer. *Journal of Scientific Instruments,* v. 32, July 1955, p. 256-257.

Description of an instrument for neutron crystallography, specially designed for measurements with single crystals. The small size is in marked contrast with that of the conventional spectrometers designed for powder diffraction methods. Photograph, graph. 5 ref. (M22)

269-M. Fields Around Impurity Atoms in Metals. L. C. R. Alfred and N. H. March. *Philosophical Magazine,* v. 46, 7th ser., no. 378, July 1955, p. 759-768.

Calculations of the potential around atoms with valency $Z + 1$ dissolved in a monovalent metal. Graphs. 5 ref. (M25)

270-M. Atomic Arrangements in Close-Packed Structures. Lester W. Strock. *Sylvania Technologist,* v. 8, July 1955, p. 71-76.

General features of close-packed structures described, with zinc sulfide as a model. Subject of polytypes introduced, and these structures, as well as the more common forms of zinc sulfide, illustrated. Photographs, diagrams. 7 ref. (M25, Zn)

271-M. The Solubility of Beryllium in Liquid Gallium, Tin and Indium, and the Phase Diagrams of Beryllium With These Metals. Reed O. Elliott and Eugene M. Cramer. *U. S. Atomic Energy Commission, AECU*-3022, 1952, 10 p.

Determined between 540 and 1200° C. All three diagrams are characterized by a wide miscibility gap in the liquid state, an absence of intermediate phases, and no detectable solid-state solubility. A monotectic was found in the beryllium-gallium system. No evidence for a eutectic was found in any of the systems. Tables, graphs, micrographs. 4 ref. (M24, P13, Be, Ge, Sn, In)

272-M. (French.) **The Alloys of Iron With Palladium and Platinum. Critical Examination of Publications on the Subject.** J. R. Knight and E. C. Rhodes. *Revue de métallurgie,* v. 52, no. 7, July 1955, p. 518-528.

Critically reviews the constitution diagrams of these alloys derived from experiments relating to their magnetic, electric and physical properties. High coercivity can be reached with certain iron-platinum compositions. Positive magnetostriction with iron-palladium and

iron-platinum alloys. Tables, graphs, phase diagrams. 43 ref.
(M24, P16, Fe, Pd, Pt)

273-M. (German.) **The Ternary Iron-Cobalt-Vanadium System. II. Formation of the Ternary System Under Equilibrium Between Alpha-Gamma Solid Solutions.** Werner Köster and Heinz Schmid. *Archiv für das Eisenhüttenwesen,* v. 26, no. 7, July 1955, p. 421-425.

Structural changes resulting from heat treating the alloys up to one year; change of physical properties due to the effects of equilibrium between alpha and gamma solid solutions; study of reaction pattern by measuring hardness, specific resistance and coercive force as a function of heat treating time and temperature. Photographs, graphs, phase diagrams, micrographs. 7 ref.
(M24, P general, Fe, Co, V)

274-M. (German.) **Structure Formation of Fine Zinc Alloys in the Chill Mold.** K. Ruttewit and E. Eichmeyer. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 662-666.

Experiments with different casting temperatures, chill-mold temperatures, and chill-mold wall thicknesses to study effect of cooling rate on structures at different places of various zinc-alloy castings. Tables, graphs, diagrams, micrographs. (M27, E25, Zn)

275-M. (German.) **Gold-Platinum-Palladium Alloys.** Ernst Raub and Georg Wörwag. *Zeitschrift für Metallkunde,* v. 46, no. 7, July 1955, p. 513-515.

X-ray investigation of the ternary system and some of the binary alloys, gold-platinum and platinum-palladium. Tables, graphs, phase diagrams. 4 ref. (M26, Au, Pd, Pt)

276-M. (Italian.) **Preparing Metallic Monocrystals.** A. Ferri. *Metallurgia italiana,* v. 47, no. 6, June 1955, p. 251-258.

Bibliographic survey of four different methods—equipment and method for making zinc, copper and silicon monocrystals. Graphs, diagrams, photographs. 15 ref.
(M26, N5, N12, Ag, Cu, Zn)

277-M. (Italian.) **A System for the Elimination of Absorption Errors in X-Ray Investigation With Debye-Scherrer Cylindrical Chambers.** Vladimiro Scatturin, Maria Tornati and Roberto Zannetii. *Ricerca scientifica,* v. 25, no. 6, June 1955, p. 1447-1460.

Use of diluting powders to obtain corrections for fractional error in interplanar distances. Tables, graphs. 13 ref. (M22)

278-M. **The Structure of Silver Electrodeposited From the Argentocyanide Bath on to Silver (110), (100) and (111) Faces.** T. H. V. Setty and H. Wilman. *Faraday Society, Transactions,* v. 51, July 1955, p. 984-995 + 2 plates.

Electron diffraction used to study systematically the surface structure of silver electrodeposited on electropolished faces of a silver single crystal. Micrographs, graphs. 6 ref.
(M27, M22, L17, Ag)

279-M. **The System Uranium-Titanium.** A. G. Knapton. *Institute of Metals, Journal,* v. 83, Aug. 1955, p. 497-504.

Showed a smooth increase from the melting point of uranium to that of titanium. A continuous series of solid solutions is formed between the gamma-modification of uranium and beta-modification of titanium. Two eutectoids form. Table, graph, phase diagrams. 13 ref.
(M24, Ti, U)

280-M. **Electronic Energy Bands in Iron.** Joseph Callaway. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 500-509.

Calculation of energy band structure of valence electrons. Application of results to energy band theory of ferromagnetism. Diagram, graphs, tables. 23 ref.
(M25, P16, Fe)

281-M. **Crystalline Microstructure and Athermic Plasticity of Hard Materials.** Adolph G. Smekal. *Powder Metallurgy Bulletin,* v. 7, Aug. 1955, p. 42-47.

Investigation of several carbides to demonstrate the relationship between the crystalline substance and the foreign matter of "real crystals". Micrographs. 8 ref.
(M26, Q23, D-n)

282-M. **Metallurgical Aspects of Microscopy.** B. W. Mott. *Research,* v. 8, Aug. 1955, p. 307-313.

Recent developments in use of phase contrast, polarized light and interferometry. Diagram, micrographs. 42 ref. (M21)

283-M. **Continuous Distribution of Dislocations: A New Application of the Methods of Non-Riemannian Geometry.** B. A. Bilby, R. Bullough, and E. Smith. *Royal Society, Proceedings,* v. 231, ser. A, Aug. 22, 1955, p. 263-273.

Theoretical development of a point of reference for defining Burgers circuits. 18 ref. (M26)

284-M. **Intermetallic Compounds Between Lithium and Lead. I. The**

Structures of Li_3Pb and Li_7Pb_2. Allan Zalkin and William J. Ramsey. *University of California Radiation Laboratory (U. S. Atomic Energy Commission),* UCRL 4508, May 1955, 16 p.

Structure of Li_3Pb is face-centered cubic, Li_7Pb_2 is hexagonal. Tables, diagrams. 12 ref. (M26, Li, Pb)

285-M. Effect of the Basic Arc Furnace Practice Upon the Nonmetallic Inclusion Content. H. Ishizuka. *Henry Brutcher Translation No.* 3430, 19 p. (From *Tetsu-to-Hagané,* v. 37, no. 7, 1951, p. 397-404.) Henry Brutcher, Altadena, Calif.

Microscopic study of nonmetallic inclusions in 0.85% carbon, 1.6 to 1.8% chromium, and 0.95 to 1.10% carbon, 1.0 to 1.5% chromium steels. Effect of operating variables on inclusion content. Graphs. 17 ref. (M27, D5, AY)

286-M. X-Ray Study of Fracture Faces of Impact Test Bars. M. P. Zheldak. *Henry Brutcher Translation No.* 3435, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 83, no. 6, 1952, p. 843-845.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 295-M, 1952. (M22, Q6, AY)

287-M. (Czech.) **Relation of Alpha and Sigma Phase in Manganese-Chromium Austenitic Steels and Distinctions Made Between These Phases by Means of Magnetic Suspension.** V. Havel and M. Zezulova. *Hutnické Listy,* v. 10, no. 7, July 1955, p. 400-403 + 2 plates.

Study of the presence and distribution of the phases in austenite and reversibility of the phases alpha $\rightleftharpoons$ sigma. Micrographs. 12 ref. (M27, SS)

288-M. (French.) **Preparation of Polycrystalline Specimens of Iron of Different Degrees of Purity in the Polygonal Crystal Form.** Jean Montuelle. *Comptes rendus,* v. 241, no. 2, July 11, 1955, p. 204-205.

Purification of iron by zone melting. Micrograph, diagram. 2 ref. (M23, D8, Fe)

289-M. (German.) **Constitutional Diagram of Iron-Iron Phosphide (Fe_2P)-Tungsten Phosphide (WP)-Tungsten.** Reinhard Schneider and Rudolf Vogel. *Archiv für das Eisenhüttenwesen,* v. 26, no. 8, Aug. 1955, p. 483-490.

Microscopic and thermal investigation of the ternary system iron-phosphorus-tungsten with phosphorus up to 22% and tungsten up to 100%. Diagrams, tables, graphs, micrographs. 13 ref. (M24, Fe, P, W)

290-M. (German.) **Detection of Dislocations in the Reduction of Tungsten, Tantalum, and Nickel Monocrystals.** M. Drechsler, G. Pankow and R. Vanselow. *Zeitschrift für physikalische Chemie (Frankfurt),* v. 4, nos. 5-6, July 1955, p. 249-263.

Several methods of gradually reducing monocrystal tips by field emission microscopes at elevated temperature and in the electric field. Micrographs, diagrams. 17 ref. (M26, Ni, Ta, W)

291-M. Alloys of Uranium and Thorium. P. C. L. Pfeil. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/416, July 1955, 7 p.

Factors affecting constitution and properties of these alloys may serve as a guide of likely behavior of other heavy metals. Graphs. 21 ref. (M general, Q general, Th, U)

292-M. Distribution and Diffusion of Components in Metal Alloys Studied by the Autoradiographic Method. S. T. Kishkin and S. Z. Bokstein. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/703, July 1955, 29 p. (Translated from the Russian.)

Autoradiographic techniques permit direct and local study of structure and properties of real bodies, furnish qualitative and quantitative picture of distribution made of elements in alloy, assist in quantitative solution of the diffusion problem along grain boundaries and within the crystal and serve as a means of understanding mechanism of influence of minor impurities. Table, graphs, micrographs, photographs, diagrams. 18 ref. (M23, N1)

293-M. Metal-Research "Hot Laboratory". N. F. Pravdjuk. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/673, July 1955, 28 p. (Translated from the Russian.)

Changes in structure and physical and mechanical properties of various structural and fissionable materials irradiated in reactors. Table, diagrams, micrograph, photographs, graphs. (M27, P general, Q general)

294-M. An Electron Diffraction Study of the Structure of Electrodeposited Nickel. I. B. C. Banerjee and A. Goswami. *Journal of Scientific & Industrial Research,* v. 14, sec. B, July 1955, p. 322-324 + 1 plate.

Structure and orientation of electrodeposited nickel from a sulfate-boric acid bath studied under vary-

ing conditions of pH, temperature and current density. Conditions which affect the crystal structure and orientation and the mode of growth of the deposit, determined. Table, micrographs. 7 ref. (M26, L17, Ni)

295-M. (English.) **Dislocation Energies in Anisotropic Crystals. A. J. E.** Foreman. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 322-330.

Detailed calculation of the elastic energy of a straight dislocation in a cubic or hexagonal crystal, for various orientations in the crystal of the dislocation line and its Burgers vector. Tables, graphs. 15 ref. (M26, P12)

296-M. (English.) **Anomalous Lattice Spacings Caused by Stacking Disorder.** Hiroshi Nimura. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 642-646.

Electron diffraction of evaporated crystallites of gold and silver shows a deviation of 0.17% from the cubic formula while aluminum shows no deviation. Tables, graphs, diagram. 6 ref. (M26, Ag, Al, Au)

297-M. (English.) **On the Structure of the X-Ray Non-Diagram Lines *K Beta n* for Elements From Cr(24) to Zn(30).** Masao Sawada, Kenjiro Tsutsumi, Toshio Shiraiwa and Masayoshi Obashi. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 647-650.

Ascribes the origin of these lines to the two-electron jump between the double-hole levels based on wave length positions. Tables, spectrograms. 7 ref. (M22, Co, Cr, Cu, Fe, Ni, Zn)

298-M. (English.) **The Interpretation of Etch Patterns on Aluminium.** A. J. Forty and F. C. Frank. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 656-663.

Study of etch patterns on polycrystals of "super-purity" aluminum suggests that an etch pit is produced only where a precipitate of impurity is present in the surface which are located on dislocations and can be regarded as an indirect cause of etching. Micrographs. 7 ref. (M21, Al)

299-M. (English.) **The Velocity of Dislocations.** J. S. Koehler. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 669-672.

Study shows that the potential energy of a dislocation is in general more than a hundred times the kinetic energy. Indicates that the rate of glide is decreased by a factor of about 50 during the production of a single slip band in aluminum. Present data also indicates that twinning requires rapid dislocations whereas slip seems to demand slow dislocations. Diagrams. 13 ref. (M26, Q24)

300-M. (English.) **The Migration of Solute Atoms to Dislocation Arrays.** B. A. Bilby. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 673-679.

Considers a model which allows for diffusion, for competition for the solute atoms between arrays or between isolated dislocations. Graphs, diagrams. 8 ref. (M26)

301-M. (English.) **On the Theory of the Kirkendall Effect.** Frederick Seitz. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 679-685.

Nature of the lattice defects which are responsible for transport of atoms in metals, Kirkendall effect is restated. 15 ref. (M26)

302-M. (French.) **Study of Crystalline Structure Using the Emission Electron Microscope.** E. Louis Huguenin. *Comptes rendus,* v. 241, no. 3, July 18, 1955, p. 307-309 + 1 plate.

Use of the electron microscope to study the Beilby layer. Diagram, micrographs. 2 ref. (M26, M21)

303-M. (German.) **Estimating the Thickness of the Beilby Layer.** Shigeto Yamaguchi. *Zeitschrift für Physik,* v. 140, no. 6, 1955, p. 577-580.

Estimating film thickness on stainless steel by using the oxide-film replica process. Analysis of refraction diagrams. Micrographs, diagrams. 11 ref. (M21, SS)

304-M. (Russian.) **X-Ray Method of Structural Analysis by Means of a Narrow Beam of Rays.** B. A. Movchan. *Zavodskaia Laboratoriia,* v. 21, no. 6, June 1955, p. 699-702.

Design and operation of X-ray apparatus, advantages of the method, field of application. Photographs, diagram. 1 ref. (M22)

305-M. (Russian.) **Reagent for Exposing Free Cementite and Segregation of Phosphorus in Carbon Steels and Cast Irons.** Kh. I. Rabinovich. *Zavodskaia Laboratoriia,* v. 21, no. 6, June 1955, p. 708-710.

Composition of the etching agent, preparation of the specimens. Micrographs. 1 ref. (M21, CI, CN)

306-M. (Russian.) **Graphic-Analytical Treatment of Dilatometric Curves.** M. M. Levitan. *Zavodskaia Laboratoriia,*

v. 21, no. 6, June 1955, p. 712-716 + 1 plate.

Method for quantitative evaluation of volumetric changes, connected with transformation during heating and cooling, based on the value of elongation and its intensity. Graphs, micrographs. (M23)

307-M. (Russian.) **Use of Radiographic Method for Investigating the Structure of Magnesium Alloys.** M. E. Drits, Z. A. Sviderskaia, and E. S. Kadaner. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 831-833 + 2 plates.

Macro and microstructures (dendritic and other formations) of two to four-component magnesium alloys, after casting and annealing. Micrographs. 1 ref. (M27, M28, N12, Mg)

308-M. (Russian.) **Radiographic Method of Studying Non-Metallic Inclusions in Copper and Its Alloys.** M. V. Pikunov. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 833-834.

Use of radioactive isotopes of calcium, tin zinc and beryllium. (M23, M27, Cu)

309-M. (Book.) **Theoretical Structural Metallurgy.** A. H. Cottrell. 2nd Ed. 251 p. 1955. St. Martin's Press Inc., 103 Park Ave., New York 17, N. Y. $4.50.

Atomic structure; theory of crystals; equilibrium states; diffusion; transformations; shear processes. (M25, M26, N general)

310-M. Phase Equilibria in the System FeO-Fe_2O_3-SiO_2. Arnulf Muan. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 965-976.

Data obtained combined with previous published data to construct lines of equal O_2 pressures and lines of equal CO_2-H_2 mixing ratios along liquidus surface. Tables, diagrams. 16 ref. (M24, Fe)

311-M. Some Aspects of Slip in Germanium. R. G. Treuting. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1027-1031.

Single crystals, strained in tension at 600° C., undergo inhomogeneous deformation, after which structure is polygonized with domain size of 2×10^{-3} cm. Photographs, diagrams, table. 14 ref. (M26, Q24, Ge)

312-M. Zirconium-Columbium Diagram. B. A. Rogers and D. F. Atkins. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1034-1041.

Part of the constitution diagram of the alloy system lying above 610° C. has been established with reasonable accuracy. However, the positions of the solvus lines descending from the ends of the eutectoid horizontal remain to be determined. Tables, X-ray defraction pattern, graphs, diagrams. 12 ref. (M24, Zr, Cb)

313-M. Lineage Structure in Aluminum Single Crystals. A. Kelly and C. T. Wei. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1041-1042.

X-ray method permits rapid survey of perfection of single crystal at a particular surface. Photographs. 8 ref. (M26, Al)

314-M. Calculation of the Entropies of Lattice Defects. H. B. Huntington, G. A. Shirn and E. S. Wajda. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1085-1091.

Method considers vibrations localized around defect as separate from elastic vibrations an appreciable distance away. Tables. 15 ref. (M26)

315-M. Lattice Vacancies and Interstitials in Metals. Harvey Brooks. Paper from "Impurities and Imperfections". American Society for Metals, p. 1-27.

Study of thermodynamic theory, formation energy and quantum mechanical calculations of vacancy and interstitial energies. Tables, graph. 28 ref. (M26, P12)

316-M. Dislocations. John C. Fisher. Paper from "Impurities and Imperfections". American Society for Metals, p. 28-40.

They provide a simple means for remembering important properties of crystalline material and causes of alloy strength. Diagrams, micrographs, graph. 2 ref. (M26)

317-M. New Solid State Remote Metallographic Facilities. M. J. Feldman. Paper from "Fourth Annual Symposium on Hot Laboratories and Equipment". TID-5280. Office of Technical Services, U. S. Department of Commerce, p. 208-224.

For the purposes of redesign and extension, the remote metallographic process was divided into mechanical, chemical, and optical operation, with consideration given to the needs and modifications of each. Table, diagrams, photographs. (M21, M23)

318-M. (English.) **Difficulties in the Theory of Dislocations.** Nevill Francis Mott. Paper from "International Conference of Theoretical Physics, Proceedings". Organizing Committee, International Conference of Theoretical Physics, Science Council of Japan, p. 565-569; disc., p. 569-570.

Experimental evidence of slip lines; dislocation mechanisms; theoretical anomalies. Graph, diagram. 11 ref. (M26, Q24)

319-M. (English.) **Dislocation Networks in Crystals.** Taira Suzuki and Hideji Suzuki. Paper from "International Conference of Theoretical Physics, Proceedings". Organizing Committee, International Conference of Theoretical Physics, Science Council of Japan, p. 570-575; disc., p. 575-576.

Studies of space distribution and mesh size of dislocation networks. 10 ref. (M26)

320-M. (English.) **What Can the Electron Microscope Teach Us About the Quality of Metals and Metal Products.** D. A. Beekhuis and J. B. Le Poole. Paper from "Rapport Europees Congres toegepaste Electronenmicroscopie". Rijksuniversiteit, p. 173-181.

The electron microscope as a tool for analysis of metallurgical failure and for prediction of a metal's performance in a given application. Micrographs. 11 ref. (M21)

321-M. (French.) **Phase Diagrams of Cryolite and Aluminate-Base Systems.** Etienne Bonnier. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 39-43; disc., p. 43.

Pure natural crystalline cryolites which allow the best reproducibility were used; their melting points were all between 998 and 1000° C. Sodium aluminates were prepared by a wet process, by sintering at 1100° C, or as *in situ* reaction between Al_2O_3 and Na_2CO_3. Graphs. 12 ref. (M24, N12, Al)

322-M. (French.) **A New Method for the Study of Aluminum and Its Alloys by Electron Diffraction.** Jean-Jacques Trillat. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 283-288.

Method of recording, continuously, the structural changes of light alloys and observing chemical reactions. Diagrams, photographs. 10 ref. (M22, Al, Cu)

323-M. (French.) **Application of Etch Figures to the Study of Structural Modifications of Aluminum and Its Alloys.** Gérard Wyon and Paul Lacombe. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 289-304; disc., p. 304.

Use of etch figures in microscopic metallography to study such problems as differentiation of grain and subgrain boundaries proceeding from the fragmentation or coalescence creep tests and the distribution of impurities (and even of their condition in the crystal lattice) based on the location and appearance of the etch figures. Micrographs, graph, photographs. 34 ref. (M21, M27, Al)

324-M. (French.) **Liquation and Equilibrium Diagrams: Applications to the Diagram of Aluminum-Iron-Silicon Alloys.** Marcel Armand. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 305-327; disc., p. 327.

Advantages of the liquation method, which depends essentially on slowly cooling the molten alloys and sampling at different stages of solidification. Graphs, tables, X-ray diffractograms, micrographs, photographs. 19 ref. (M24, Al, Fe, Si)

325-M. (French.) **Some Aspects of Industrial 2% Copper Beryllium Alloys With the Electron Microscope.** A. Saulnier. Paper from "Rapport Europees Congres toegepaste Electronenmicroscopie". Rijksuniversiteit, p. 183-193.

Method of testing industrial specimens of beryllium bronzes in the electron microscope to determine influence of annealing treatments at around 600° C. and the influence of cold working between quenching and annealing. Micrographs, diagram. 3 ref. (M27, J23, Cu)

326-M. (French.) **Influence of Attack in Electron Metallography.** L. Habraken. Paper from "Rapport Europees Congres toegepaste Electronenmicroscopie". Rijksuniversiteit, p. 207-215.

Role of the reagent in the etch solution and the solvent in electron metallography. Micrographs. (M21)

327-M. (French.) **Special Structural Characteristics of Hard WC-TiC-TaC-Co Alloys Seen by the Electron Microscope.** R. Bernard and S. Bernard. Paper from "Rapport Europees Congres toegepaste Electronenmicro-

scopie". Rijksuniversiteit, p. 217-221.

Simplified technique of double silica replica on plexiglas to study polished and attached surfaces of the alloys. Micrographs. 3 ref. (M21, M27, SG-m)

328-M. (French.) **Very Fine Oriented Structures Observed by Electron Microscopy on the Faces of Crystals of Aluminum and Its Alloys.** P. Bussy. Paper from "Rapport Europees Congres toegepaste Electronenmicroscopie". Rijksuniversiteit, p. 347-351.

Etch-figure method to explain above phenomena. Micrographs, diagram. 9 ref. (M21, M27, Al)

329-M. (German.) **Structure and Determination of the Thickness of Zinc Coatings.** Walter Katz. *Stahl und Eisen,* v. 75, no. 17, Aug. 25, 1955, p. 1101-1106.

Results of tests on galvanized sheets of different manufacturers, detection of defects and irregularities in the coat, results of tests on galvanized wires, equipment for the electrochemical determination of the thickness of the coat layer. (M27, S14, Sn)

330-M. (German.) **Danger of Excessive Crystal Growth in Aluminum Cast Alloys.** Hermann Kessler and Hans Ludwig Winterstein. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 545-546.

Formation of microfissures in aluminum-silicon alloys caused by contraction stress in the primary crystals. Micrographs. (M26, N12, Al, Si)

331-M. (German.) **Crystal Structure Investigation on Sintered Hard Metal Fracture.** Hermann Pfisterer and Hildegard Kasperek. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 574-578.

Structures of tungsten carbide + cobalt, titanium and tungsten carbides + cobalt, and tungsten, titanium and tantalum carbides + cobalt clarified by electron microscopy. Tables, micrographs. 9 ref. (M26, EG-d)

332-M. (Italian.) **Color Metallography of Ferrous Alloys.** A. Scortecci and C. Durand. *Metallurgia italiana,* v. 47, no. 7, July 1955, p. 305-308 + 8 plates.

General discussion of method and observations; bibliography. Tables, micrographs. 41 ref. (M23, Fe, ST, SS, Mn, CI)

333-M. (Russian.) **Nature of "Naphthalene-Like" [Transcrystal] Fracture of High-Speed Steel.** **I. A.** Geller. *Stal',* v. 15, no. 7, July 1955 p. 630-634.

In certain heat treatments or cold working, the steel develops a fracture across the grains which results from exceptionally coarse grains and the concomitant carbide precipitation. Micrographs, graph. 6 ref. (M27, N7, TS)

334-M. (Russian.) **Phase Analysis of Aluminum-Base Alloys.** N. I. Blok, O. A. Dubovikova-Khromova, and N. F. Lashko. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 894-899.

Electrochemical separation of phases in aluminum alloys using anhydrous electrolytes; method developed for anode solution of aluminum-copper alloys by liquid nitrogen cooling during electrolysis; effect of aging on intermetallic phases; crystalline lattice of cast, pressed and heat treated aluminum alloy. Tables. X-ray, micrographs. 5 ref. (M26, M23, Al, Cu, Fe, Ni)

335-M. (Russian.) **Micro-Investigation of Steel in a Magnetic Field.** A. N. Cherviakov. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 945-948.

Differentiation of the ferro from the nonferromagnetic phases (alpha from sigma) and determination of alpha phase in austenitic steels; magnetic structure and crystallographic orientation. Diagrams, micrographs. 7 ref. (M26, M23, AY, SS)

336-M. **A Study of the Etching Rate of Single-Crystal Germanium.** Paul R. Camp. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 586-593.

Principal etchants were composed of only hydrogen peroxide (H_2O_2), hydrofluoric acid (HF) and water (H_2O). Graphs, tables. 4 ref. (M21, Ge)

337-M. **Dislocations in Germanium.** S. G. Ellis. *Journal of Applied Physics,* v. 26, Sept. 1955, p. 1140-1146.

Light microscope study of etched crystals has shown formation of small angle grain boundries and screw dislocations. Photographs, diagrams. 13 ref. (M26, Ge)

338-M. **Screw Dislocations in Growth From the Melt.** G. W. Sears. *Journal of Chemical Physics,* v. 23, Sept. 1955, p. 1630-1632.

Shown to operate for certain faces of lead iodide at small supercoolings. Photographs. 15 ref. (M26)

339-M. **Macro-Etching of Iron and Steel.** *Metal Progress,* v. 68, Aug. 15, 1955, p. 195-200.

Equipment, procedure and inter-

pretation of results from simple qualitative technique. Tables, photographs. (M21, CI, ST)

340-M. A Quarter Century of Metallurgical Science. Cyril Stanley Smith. *Metal Progress,* v. 68, Sept. 1955, p. 137-140.

Past progress and present trends. (M general, N general, P general)

341-M. X-Ray Extinction and the Effect of Cold Work on Integrated Intensities. G. K. Williamson and R. E. Smallman. *Physical Society, Proceedings,* v. 68, no. 429B, Sept. 1955, p. 577-585.

Cold work reduces intensities of line by factor between 3 and 5%. Graphs. 8 ref. (M22, Cu, Al)

342-M. Report of AEC Cooperative Metallographic Group on Zirconium-Base Alloys. R. M. Treco, R. F. Dickerson and H. P. Roth. *Sylvania Electric Products, Inc. (U. S. Atomic Energy Commission),* TID-5131, Mar. 1953, 61 p.

Detailed microstructures of dilute binary alloys of zirconium presented for various heat treatments. Information on preparation and examination of alloy samples. Table, micrographs. 16 ref. (M27, Zr)

343-M. (Czech.) Structure of Grey and White Cast Irons at High Temperatures. Ladislav Bezdek and Dalibor Ruzicka. *Slévarenstvi,* v. 3, no. 8, Aug. 1955, p. 225-233.

Special microscope, specimen preparation and techniques. Applied to study of primary austenite dendrite structure and other formations at 1000° C. Diagram, photograph, micrographs. (M21, M27, CI)

344-M. (French.) Conditions for the Appearance of the Exaggerated Growth of Crystals in Soft Iron. Pierre Coulomb and Paul Lacombe. *Comptes rendus,* v. 241, no. 5, Aug. 1, 1955, p. 494-496.

Results of tests in which soft iron was subjected to cold working by cold rolling, followed by pure and dry hydrogen annealing. Graph, table, microphotograph. 6 ref. (M26, N3, Fe)

345-M. (French.) Dilatometric Thermal Analysis of Samarium Ferrite and Magnetic Transitions of Rare Earth Ferrites. Georges Guiot-Guillain and Xavier Waché. *Comptes rendus,* v. 241, no. 6, Aug. 8, 1955, p. 550-552.

Dilatometric study of $FeO_3 \cdot Sm_2O_3$ makes it possible to reveal the difference in nature between certain transitions presented by this ferrite and other rare earth ferrites. Graph. 8 ref. (M23, Sa, Fe)

346-M. (French.) Recent Applications of X-Ray Diffraction to the Study of Metals. Gilles Pomey. *Métaux corrosion-industries,* v. 30, nos. 359-360, July-Aug. 1955, p. 304-312.

Use of X-ray diffraction in study of crystalline imperfections and preferential orientations. Development of intensity counters reviewed. Micrographs, diagrams. 19 ref. (M22)

347-M. (German.) The Iron-Phosphorus-Vanadium System. Berthold Stengel and Rudolf Vogel. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 547-554.

Results of microscopic and X-ray investigation of the three element system with up to 22% phosphorus and 60% vanadium content, the crystal formation of the phases in the system and the equilibrium condition and graphs in the system Fe-Fe_2P-V_2P-V. Graphs, tables, micrographs. 14 ref. (M24, Fe, V)

348-M. (German.) The Three-Element System: Cobalt-Chromium-Carbon. Werner Köster and Franz Sperner. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 555-559.

Microscopic, X-ray and magnetometric investigation to determine transformation and space condition in the system. Micrographs, tables, graphs. 12 ref. (M24, Co, Cr)

349-M. (Italian.) Researches on the Iron-Nitrogen System. A. Burdese. *Metallurgia italiana,* v. 47, no. 8, Aug. 1955, p. 357-361, 366.

Nitriding carried out in controlled atmosphere, Geiger-counting spectrometer used for some roentgenographic measures on solids. Graphs, tables, spectrograph. 16 ref. (M24, J28, Fe)

350-M. (Russian.) Microdeformations in the Crystal Lattice of Alpha-Iron in the Case of Quenched and Tempered Steel. B. Ia. Pines. *Doklady akademii nauk SSSR,* v. 103, no. 4, Aug. 1, 1955, p. 601-604.

Series of equations for values of epsilon and other phases. Table, graphs. 5 ref. (M26, Q24, ST)

351-M. (Russian.) Study of Limited Solid Solutions of Nickel by the X-Ray Structural Method. I. I. Kornilov and A. Ia. Snetkov. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 7, July, p. 84-88.

Composition-parameter diagram of nickel alloys with aluminum, tungsten, chromium, or titanium, and of ternary systems of nickel with the same element; lattice parameters and the degree of distortion of the

crystal lattice of nickel solid solutions. Tables, graphs. 12 ref. (M26, M24, Ni, Ti, W, Cr)

352-M. (Book.) **Impurities and Imperfections.** 231 p. 1955. American Society for Metals, 7301 Euclid Avenue, Cleveland 3, Ohio. $6.00.

Fundamentals of point, line, and surface imperfections. Effects of both impurities and imperfections on metallurgical reactions and on properties. Coverage is also given to semiconductors, ionic crystals, and radiation effects. (M general, N general)

353-M. (Book.) **Reports of the European Congress of Applied Electron Microscopy, Ghent. Rapport Europees Congres toegepaste Electronenmicroscopie.** G. Vandermeerssche. 359 p. 1954. Rijksuniversiteit, Rozier 6, Gent, Belgium.

Series of reports in the Western European languages and English devoted to industrial and medical applications of electron microscopy. (M21)

354-M. A Precision X-Ray Powder Camera. *American Mineralogist,* v. 40, Sept.-Oct. 1955, p. 876-884.

In cylindrical camera, sample is successively photographed on peripheral positions at opposite ends of a diameter while film remains unmoved. Diagrams, photographs, tables. (M22)

355-M. Precision Determination of Lattice Constants With a Geiger-Counter X-Ray Diffractometer. A. Smakula and J. Kalnajs. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1737-1743.

Diagrams, graphs, tables. 28 ref. (M22)

356-M. Energy Levels of a Crystal Modified by Alloying or by Pressure. R. H. Parmenter. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1759-1766.

Perturbation method of calculating energy levels. 10 ref. (M26, P12)

357-M. Uniform Strains and Deformation Potentials. R. H. Parmenter. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1767-1776.

Perturbation method of calculating the energy levels of a crystal modified by an arbitrary uniform strain. 6 ref. (M26, Q24, P12)

358-M. X-Ray Scattering Effects Due to Localized Static Lattice Defects. Charles W. Tucker, Jr., and Peter Senio. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1777-1781.

Experimental verification of theoretical calculations which show that elastic singularities in a crystalline lattice should produce four specific X-ray scattering effects which include diffuse scattering and an artificial temperature factor. Laue patterns. 16 ref. (M22, M26)

359-M. Computation of Mean Debye Temperature of Cubic Crystals From Elastic Constants. II. Paul M. Sutton. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1826-1830.

Derivation of equations, analysis of accuracy of calculations. Table, graphs. 13 ref. (M26, Q21)

360-M. (French.) **Formation and Advantages of Oriented Structures Obtained by Sublimation on Magnesium.** L. Grall. *Revue de métallurgie,* v. 52, no. 8, Aug. 1955, p. 603-610; disc., p. 610-611.

New method for producing "sublimation figures" by heating metal between 550 and 650° C. for short periods in high-purity argon. Micrographs. 7 ref. (M23, Mg)

361-M. (German.) **Electron Microscope and the Polished Metal Surface.** E. Brüche and H. Poppa. *Metalloberfläche,* Ausgabe A, v. 9, no. 9, Sept. 1955, p. 129-135.

Process of electron microscopy with special regard to its application on metal surfaces polished by different methods. Diagrams, micrographs, photographs. 7 ref. (M21, L10, L12, L13)

362-M. (German.) **Explanation of the Fracture of Metallic Materials by the Use of New Microscopic Testing Methods.** Zdenek Kaderavek. *Metallurgie,* v. 5, no. 7, July 1955, p. 218-226.

Fractographic studies. Micrographs, graphs. 15 ref. (M23)

363-M. (Russian.) **Effect of Mechanism of Casting Formation on Cast Iron Structure.** V. M. Pishchev. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 8, Aug., p. 107-118.

Size, form and distribution of graphite; microstructure of the basic metallic mass; factors affecting rate of crystallization; effect of thickness and length of casting; effect of techniques, such as centrifugal casting. Micrographs, photographs. 8 ref. (M27, N12, CI)

364-M. A Microscopical Examination of Samples of Iron Containing Titanium-Bearing Inclusions. F. B. Pickering. *Iron and Steel Institute, Journal,* v. 181, Oct. 1955, p. 147-149 + 2 plates.

Establishes means of identification by determination of optical and

chemical characteristics of inclusion. Micrographs, table. 4 ref. (M21, Fe, Ti)

365-M. The Metallographic View. XV. Structures and Quenching Rates. H. E. Boyer. *Steel Processing,* v. 41, Oct. 1955, p. 642, 671.

Chart shows results of standard end quench using plain carbon steel. Micrographs, graph. (M27, J26, CN)

366-M. Types of Dislocation Source. B. A. Bilby. Paper from "Defects in Crystalline Solids". The Physical Society, p. 124-133.

Considers low-stress and spontaneous dislocations involving the Frank-Read source and cone source in the face-centered cubic lattice. Diagrams. 19 ref. (M26)

367-M. Crystal Growth and Lattice Defects. W. Dekeyser. Paper from "Defects in Crystalline Solids." The Physical Society, p. 134-142 + 4 plates.

Reviews work on crystal growth and defects at the University of Ghent. Covers growth following the Frank mechanisms and polytypism, growth producing spiral pits, dissolution and etching and growth of silver chloride on sodium chloride and its relation with epitaxy. Diagram, micrographs. 42 ref. (M26, N12)

363-M. The Electrical Effects of Dislocations in Germanium. W. T. Read, Jr., and G. L. Pearson. Paper from "Defects in Crystalline Solids". The Physical Society, p. 143-152.

Current theoretical developments and pronounced electrical response to germanium crystal disturbances permits many new studies. Graphs, diagrams. 5 ref. (M26, P15, Ge)

369-M. Dislocations in Face-Centered Cubic Lattices. N. Thompson. Paper from "Defects in Crystalline Solids". The Physical Society, p. 153-158.

Considers limitations imposed by geometry of the crystal lattice on the nature and configuration of dislocations in a face-centered cubic lattice. Graph, diagrams. 6 ref. (M26)

370-M. Hexagonal Networks of Dislocations. F. C. Frank. Paper from "Defects in Crystalline Solids". The Physical Society, p. 159-168.

It is shown that there is only a restricted range of possibilities and the simplest and presumably commonest type corresponds to disorientations by rotation about a (111) axis. Diagrams. 7 ref. (M26)

371-M. An Experimental Study of Dislocations in Aluminium-Copper Alloys by Means of Precipitation. H. Wilsdorf and D. Kuhlmann-Wilsdorf. Paper from "Defects in Crystalline Solids". The Physical Society, p. 175-186 + 4 plates; disc., p. 425.

Results of an electron microscopical investigation into preferred precipitation in slip lines and dislocations in aluminum with 1.2 to 4.8% copper. Table, graph, diagrams, micrographs. 20 ref. (M26, N7, Ag, Cu)

372-M. The Influence of Dislocations and Impurities on the Distribution and Size of Etch-Figures on Pure Aluminium. G. Wyon and P. Lacombe. Paper from "Defects in Crystalline Solids". The Physical Society, p. 187-196 + 4 plates.

Concludes that origin of etch-pits on pure aluminum cannot be explained only by dislocations emerging at the surface of crystals, but that associations of dislocations and impurity atoms are necessary for the formation of etch-figures. Table, diagrams, graph, micrographs. 20 ref. (M26, Al)

373-M. Stored Energy and Lattice Defects in Cold-Worked Metals. W. Boas. Paper from "Defects in Crystalline Solids". The Physical Society, p. 212-221; disc., p. 425-426.

Changes in internal energy, electrical resistivity, density and hardness, which occur during the annealing of copper and nickel deformed at room temperature, show that almost all the energy stored in copper is due to dislocations, but that vacancies make a significant contribution to that stored in nickel. Graphs, diagram, X-ray. 11 ref. (M26, Q24, Cu, Ni)

374-M. Radiation Disarrangement of Crystals. J. S. Koehler and F. Seitz. Paper from "Defects in Crystalline Solids". The Physical Society, p. 222-231; disc., p. 426-427.

Possible kinds of imperfections produced by irradiation, amounts of various imperfections produced, annealing processes, both thermal and those resulting from irradiation. Graphs. 25 ref. (M26, P13, J23)

375-M. Recent Experiments at Harwell on Irradiation Effects in Crystalline Solids. R. A. Dugdale. Paper from "Defects in Crystalline Solids". The Physical Society, p. 246-251.

Bombardment effects in boron nitride, platinum, tungsten, molybdenum and the alloy, Cu_3Au, by a variety of radiations. Graphs, diagram. (M26, P10, Au, B, Cu, Mo, Pt, W)

376-M. Stacking Faults in Close-Packed Lattices. A. Seeger. Paper

from "Defects in Crystalline Solids". The Physical Society, p. 328-339.

It is concluded that monovalent metals and cobalt should have low stacking fault energies, whereas aluminum, magnesium, zinc, cadmium, nickel, palladium and platinum should have high stacking fault energies. Graphs, diagram. 16 ref. (M26)

377-M. Activation Energy Problems Associated With Extended Dislocations. G. Schoeck and A. Seeger. Paper from "Defects in Crystalline Solids". The Physical Society, p. 340-346.

Outlines and applies an improved method for calculating line energies of dislocations on the basis of Peierls' model to the calculation of the energy of constrictions in extended edge and screw dislocations in aluminum and copper. Diagram, graphs. 13 ref. (M26, P12, Al, Cu)

378-M. Sub-Structures and Networks of Dislocations in Face-Centred Cubic Metals. Taira Suzuki and Toru Imura. Paper from "Defects in Crystalline Solids". The Physical Society, p. 347-358 + 3 plates.

Demonstrates directly some regular arrangements of dislocations, nearly all of which form the predicted three-dimensional structures in face-centered cubic metals, by a delicate technique of chemical etching. Investigates formation of the dislocation networks and effects of alloying elements and of annealing upon them. Diagrams, graphs, micrographs, X-ray diffractograms. 17 ref. (M26)

379-M. The Surface Topography of Diffusion Couples. R. S. Barnes. Paper from "Defects in Crystalline Solids". The Physical Society, p. 359-368 + 4 plates.

Free surfaces of copper-nickel diffusion couples examined microscopically and with X-rays; observed features related to the behavior of the underlying metal. Voids, which form near to the interface in the faster diffusing metal, produce pits in the surface when they are revealed by the evaporation of the metals, which occurs during the anneal. Diagrams, micrographs. 8 ref. (M26, N1, Cu, Ni)

380-M. Lattice Vacancies in the Alkali Metals. D. K. C. MacDonald. Paper from "Defects in Crystalline Solids". The Physical Society, p. 383-390.

Influence of lattice defects (of Schottky, Frenkel-type or perhaps 'crowdions') in several properties of the alkali metals over an appreciable temperature range below the melting point. Specific heat, electric conductivity and thermo-electric power considered. Graphs. 19 ref. (M26, P general, EG-e)

381-M. Jogs in Dislocation Lines. A. Seeger. Paper from "Defects in Crystalline Solids". The Physical Society, p. 391-401.

Study of jogs in various lattices. Concepts of 'intersection jogs' and 'diffusional jogs' introduced; work shows that in lattices based on these two types jogs will, in general, have different energetical and geometrical properties. Tables, diagrams, graph. 18 ref. (M26)

382-M. Small Angle Scattering of X-Rays by Cold-Worked Metal. J. Blin. Paper from "Defects in Crystalline Solids". The Physical Society, p. 420-422.

Pure metal foils of aluminum, copper, nickel and zinc are examined. Specimen extension gives stronger scattering. Tables, graph, diagram. 2 ref. (M26, M22, Al, Cu, Ni, Zn)

383-M. (English.) **Pearlite and Bainite Structures in a Eutectoid Carbon Steel. An Electron Microscopic Investigation.** Helfrid Modin and Sten Modin. *Jernkontorets annaler,* v. 139, no. 8, 1955, p. 481-512.

Description of structures after isothermal transformation at different temperatures; discussion of formation mechanism. Micrographs. (M27, N8, CN)

384-M. (English.) **An Improvement in the Replica Technique for Electron Microscopy of Structures in Steel.** Helfrid Modin. *Jernkontorets annaler,* v. 139, no. 8, 1955, p. 521-523.

Carbide particles, broken loose in removing the plastic replica film and obscuring the electron micrograph, can be removed by treatment with dilute acids. Micrographs. (M21, ST)

385-M. (German.) **Radiographic and Radiometric Surface Analysis of Light-Metal Alloys.** Wolfgang Braun. *Zeitschrift für angewandte Physik,* v. 7, no. 9, Sept. 1955, p. 427-433.

Activation of objects for taking autoradiographic pictures; photoemulsion compositions. Graphs. 13 ref. (M23, EG-a)

386-M. (Spanish.) **The "Delta" Constituent in Aluminum Bronze.** Justo Ferrer Flotats. *Instituto del hierro y del acero,* v. 8, no. 36, Apr.-June 1955, p. 202-221.

Discusses phase equilibria, outlining experimental work on four specimens of different chemical composition, in which a study was made on the structures obtained in various heat treatments, metallographic identification and morphology of formation of the delta phase. Graphs, tables, micrographs. 16 ref. (M26, N6, Al, Cu)

387-M. Zirconium-Germanium Alloy System. O. N. Carlson, P. E. Armstrong and H. A. Wilhelm. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 40, 1955, 13 p.

Four intermediate phases have been proposed on the basis of microstructures and X-ray data, and peritectic transformation points determined. It is shown that there exists limited solid solubility of germanium in zirconium and negligible solid solubility of zirconium in germanium. Table, graph, micrographs. 8 ref. (M24, Zr, Ge)

388-M. Approximate Phase Relationships in the Titanium-Vanadium-Aluminum System at 1800° F and at 1400° F. Charles B. Jordan and Pol Duwez. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 42, 1955, 16 p.

Temperatures lie respectively above and below the allotropic transformation point of titanium at 1620° F. No new phases were found in the three binary systems. Tables, graphs. 21 ref. (M24, Ti, V, Al)

389-M. Vacancies in Monovalent Metals. F. G. Fumi. *Philosophical Magazine,* v. 46, 7th ser., no. 380, Sept. 1955, p. 1007-1020.

Simplified calculation of energy required to form vacancy in noble and alkali metals. Tables. 31 ref. (M26, P12)

390-M. (French.) **Examination With Interferential Contrast of the Fine Microstructure of an Alpha Brass Ruptured Under Alternating Stresses.** Pierre A. Jacquet. *Comptes rendus,* v. 241, no. 13, Sept. 26, 1955, p. 798-800.

Normarski optical device with two polarized waves shows substructure in grains of 37% copper brass. Describes best electrolytic polishing and attack conditions for this type of examination. Micrograph. 3 ref. (M27, M21, Cu)

391-M. (German.) **The Three-Element System Nickel-Chromium-Carbon.** Werner Köster and Sigrid Kabermann. *Archiv für das Eisenhüttenwesen,* v. 26, no. 10, Oct. 1955, p. 627-630.

Microscopic and X-ray investigation for the determination of transformations and phase boundaries. Graphs, micrographs, tables. 6 ref. (M24, Cr, Ni)

392-M. (German.) **The Three-Element System Iron-Phosphorus-Tin.** Rudolf Vogel and Gerhard Zwingmann. *Archiv für das Eisenhüttenwesen,* v. 26, no. 10, Oct. 1955, p. 631-640.

Chemical and metallographic investigation of transformation and space conditions in the system iron-iron phosphide-tin phosphide-tin; the affinity of iron and tin to phosphorus. Diagrams, graphs, tables, micrographs. 7 ref. (M24, N6, Fe, P, Sn)

393-M. (German.) **New Method of Measurement of the Last Debye-Scherrer Lines by a Counter Tube.** Rudolf Berthold and Volkmar Gerold. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 599-601.

Instrument and its functions, exactness of measurement, method of determinating the lattice constants. Diagrams, graphs, tables. (M22)

394-M. (German.) **New Precise X-Ray Apparatus for Fine Structure Investigation, With an Improved Focusing Monochromatic and Precision Focusing Tubes.** Ernst-Günter Hofmann and Heinz Jagodzinski. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 601-610.

Advantages of precision focusing tubes, errors of monocromatic reading, failure of the camera. Diagrams, graphs, photographs, table. 19 ref. (M22)

395-M. (German.) **Micrographical Investigation of Free-cutting Steel.** Hans Neff. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 614-615.

Method of operation and selection of suitable radiation for determination of manganese sulfide in free-cutting steel. Graph, photographs. 3 ref. (M27, S19, ST)

396-M. (German.) **Double Cone Method and Its Suitability for Investigation of Deformation and X-Ray Diffraction Pattern.** Heribert Herglotz. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 620-622.

Method for study of microstructure as applied to recrystallized and milled pure aluminum. Diagrams, photographs. 8 ref. (M22, M27, Al)

397-M. (German.) **Bonding Conditions in Metallic Phases.** Ulrich Dehlinger, Herbert Schenk and Wolfgang Weser. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 647-650.

Bonding in metal phases, as a general case, and unipolar and heteropolar bonding, as a boundary case, of

Bloch's method. Gives examples. Diagram. 21 ref. (M26)

398-M. (German.) **New Method of Projecting Crystalline Structure Picture by X-Ray Interferences.** Hugo Seemann. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 722-730.

Beam focusing, spherical geometry of X-ray and electron beam interferences, pinhole camera method. Graphs, diagrams, photographs. 13 ref. (M26, M23)

399-M. (Italian.) **Researches on the Manganese-Nitrogen System.** C. Brisi.

Metallurgia italiana, v. 47, no. 9, Sept. 1955, p. 405-408.

Particular reference to low-nitrogen zone (up to 6% in weight), because of conflicting data in literature. Graphs, table. 10 ref. (M24, N, Mn)

400-M. (Italian.) **Contribution of Electron Microscopy to the Study of Metal Structures.** G. Bonfiglioli and A. Ferro. *Metallurgia italiana,* v. 47, no. 9, Sept. 1955, p. 409-414.

Evidence of high resolving power which broadens study possibilities. Micrographs. 6 ref. (M21)

401-M. (Book.) **Defects in Crystalline Solids.** 429 p., 27 plates. 1955. The Physical Society, 1 Lowther Gardens, Prince Consort Road, London S. W. 1, England. 40s.

Conference presenting papers on dislocations and point defects, and methods of investigating their properties. (M26)

SECTION N

TRANSFORMATIONS and RESULTING STRUCTURES

1-N. The Role of Inverse Segregation and Redistribution of Solute Atoms in the Freezing of Hypoeutectic Lead-Antimony Alloys. A. C. Simon and E. L. Jones. *Electrochemical Society, Journal,* v. 101, Nov. 1954, p. 536-545.

Causes of antimony segregation at faces of battery grid castings. Micrographs, diagram, graphs. 39 ref. (N12, Pb, Sb)

2-N. Diffusion of Hydrogen and Deuterium in High Purity Zirconium. Earl A. Gulbransen and Kenneth F. Andrew. *Electrochemical Society, Journal,* v. 101, Nov. 1954, p. 560-566.

Reactions are diffusion controlled. Experimental data fit theoretical explanations. Graphs, tables. 17 ref. (N1, Zr)

3-N. High Temperature Crystal Structure of Thorium. Premo Chiotti. *Electrochemical Society, Journal,* v. 101, Nov. 1954, p. 567-570.

X-ray diffraction patterns and electrical resistivity show transformation from face-centered to body-centered cubic at ± 1400° C. Carbon increases transformation temperature. Diagram, graphs, micrograph. 6 ref. (N6, Th)

4-N. Effect of Carbon Content on the 500° F. Embrittlement of Tempered Martensite. P. Payson. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1242-1243.

Decomposition of martensites containing 0.06, 0.13 and 0.25% carbon. Graphs. 5 ref. (N8, Q23, ST)

5-N. An Examination of the Decrease of Surface-Activity Method of Measuring Self-Diffusion Coefficients in Wustite and Cobaltous Oxide. R. E. Carter and F. D. Richardson. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1244-1257.

Radioisotopes used to show cobalt diffuses via vacant cation sites. Below 850° C. the surface activity method is not satisfactory for wustite. Tables, diagram, micrographs, photographs, graphs. 22 ref. (N1, Fe, Co)

6-N. Effect of Nitrogen on Sigma Formation in Cr-Ni Steels at 1200° F. (650° C.). G. F. Tisinai, J. K. Stanley and C. H. Samans. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1259-1267.

Nitrogen causes significant shifts of phase boundaries in the sigma region. Tables, micrographs, graphs. 7 ref. (N8, SS)

7-N. Stabilization of the Bainite Reaction. R. F. Hehemann and A. R. Troiano. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1272-1280.

Influence of partial high-temperature decomposition on reaction kinetics at lower temperatures for two alloy steels. Table, graphs, micrographs. 26 ref. (N8, AY)

8-N. Data for One of the Martensitic Transformations in an 11 Pct Mo-Ti Alloy. S. Weinig and E. S. Machlin. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1280-1281.

Experimental data on habit orientation, lattice relations, shear strain and orientation of subband markings. Tables, micrograph, diagram. 4 ref. (N9, Mo, Ti)

9-N. (French.) **Experimental Thermodynamic Study of the Platinum-**

Copper Superlattice. Pierre Assayag and Maurice Dodé. *Comptes rendus,* v. 239, no. 13, Sept. 27, 1954, p. 762-764.

Oxidation equilibrium pressures of Pt-Cu alloys to prove existence of zones of composition for which the alloy is made up of two phases in equilibrium, and to determine with precision the composition of these phases. Graphs. 3 ref. (N10, Pt, Cu)

10-N. (German.) **Orientation Relationships and Growth in the Recrystallization of Aluminum.** Bernhard Liebmann. *Naturwissenschaften,* v. 41, no. 19, Oct. 1, 1954, p. 447-448.

Experimental study of relationship between recrystallization and deformation, and rate of crystal growth as a function of annealing time. Diagrams, graph. 3 ref. (N5, Al)

11-N. (Russian.) **The Showing of Intercrystallite Internal Adsorption in Aluminum Alloys by the Method of Microhardness.** V. I. Arkharov, I. P. Berenova and N. A. Kozina. *Doklady Akademii Nauk SSSR,* v. 98, no. 2, Sept. 11, 1954, p. 207-209.

Variation in microhardness according to grain size, aging and heat treatments. Graphs. 1 ref. (N7, Q29, Al)

12-N. The Solid Solution of Cadmium in Zinc. J. R. Brown. *Institute of Metals, Journal,* v. 83, Oct. 1954, p. 49-52.

Lattice parameter measurements of quenched alloys. Solubility of 1.83 wt.% is lower than previously reported. Tables, graphs. 7 ref. (N12, M26, Cd, Zn)

13-N. Growth Twins in Crystals of Low Co-Ordination Number. E. Billig. *Institute of Metals, Journal,* v. 83, Oct. 1954, p. 53-56 + 2 plates.

Studies on single crystals of germanium and silicon suggest a mechanism of twin formation. Diagram, table, graph, photographs. (N12, M27, Ge, Si)

14-N. The Bainitic Transformation of the Beta Phase in Copper-Zinc Alloys. R. D. Garwood. *Institute of Metals, Journal,* v. 83, Oct. 1954, p. 64-68 + 1 plate.

Studies on alloy with 41.3% zinc from 170 to 470° C. show mechanism is similar to bainitic transformation in steel. Graphs, tables, micrographs, diffraction pattern. 12 ref. (N9, Cu, Zn)

15-N. Diffusion of Nitrogen and Oxygen in Titanium. R. J. Wasilewski and G. L. Kehl. *Institute of Metals, Journal,* v. 83, Nov. 1954, p. 94-104 + 1 plate.

Tests in range 900 to 1570° C. show diffusion rate for nitrogen is independent of concentration while rates for oxygen decrease at higher concentrations. Graphs, micrographs. 22 ref. (N1, Ti)

16-N. Isothermal Transformations of Eutectoid Aluminium Bronzes. R. Haynes. *Institute of Metals, Journal,* v. 83, Nov. 1954, p. 105-114 + 1 plate.

Time-temperature-transformation diagrams for the range 350 to 560° C. Nickel has little effect on transformation rate. Tables, diagrams, graphs, micrographs. 23 ref. (N9, Cu, Al)

17-N. Conditions for Porosity Formation During Diffusion. R. W. Balluffi and L. L. Seigle. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1380-1382.

Formal relationships defining the regions of the diffusion zone where porosity tends to form during the Kirkendall effect. 9 ref. (N1)

18-N. Forming Point-Contact Silicon Transistors. Harold Jacobs, Frank A. Brand, Wesley Matthei and Alexander P. Ramsa. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1406-1412.

New technique in which a suitable impurity is arced at the surface of the silicon causing the impurity to be diffused into a small region. Diagrams, tables, graphs. (N1, Si)

19-N. Graphitization in Steel. A. M. Hall. *Materials & Methods,* v. 40, Nov. 1954, p. 96-99.

Nature of graphitization, effects on steel properties, mechanism of formation and its prevention. Micrographs, diagram, photographs, graph, table. 10 ref. (N8, ST)

20-N. Spheroidal Graphite Formation. E. Ward. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 155-158.

Various theories. Micrographs. 20 ref. (N8, CI)

21-N. Diffusion of Cadmium, Indium, and Tin in Single Crystals of Silver. C. T. Tomizuka and L. Slifkin. *Physical Review,* v. 96, ser. 2, Nov. 1, 1954, p. 610-615.

Diffusion coefficients of radioactive tracers were measured at 592 to 937° C. Graphs, tables. 15 ref. (N1, Ag, Cd, In, Sn)

22-N. Effect of Precipitation Hardening on the Superconducting Transition of an Aluminum Alloy. R. E. Mould and D. E. Mapother. *Physical Review,* v. 96, ser. 2, Nov. 1, 1954, p. 797-798.

Effect of heat treatment on aluminum and 63S aluminum alloy. 3 ref. Graphs. (N7, P15, Al)

23-N. (French.) **Contribution to the Study of Electrolytic Extraction of Carbides From High Speed Steel.** J. Papier. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 723-734; disc., p. 734.

Amount and nature of carbides not dissolved after austenitizing at various temperatures and times. Tables, graphs, micrographs, diagram. (N8, TS)

24-N. (German.) **On the Diffusion Mechanism in Interstitial Solid Solutions.** Hermann Schumann. *Metallurgie und Giessereitechnik,* v. 4, no. 9, Sept. 1954, p. 385-388.

Geometry of place-change process and importance of diffusion rate of interstitial particles to the cloud theories, especially from the standpoint of embrittling of iron and steel. Tables, diagrams, graphs. 13 ref. (N1, Fe, CN)

25-N. (Russian.) **Accelerated Graphitization of White Cast Iron With Increased Chromium Content.** M. A. Krishtal. *Doklady Akademii Nauk SSSR,* v. 98, no. 4, Oct. 1, 1954, p. 583-584.

Relation between speed of graphitization and antimony content. Graph. 5 ref. (N8, CI)

26-N. (Russian.) **Liberation of Gases Dissolved in Metal.** D. P. Lovtsov. *Liteinoe Proizvodstvo,* 1954, no. 5, Aug., p. 24-25.

Experiments on aluminum alloys and silicon brass used to establish theory of solubility and evolution of gases by metals. Graph, diagrams, photographs. (N15, Al, Cu)

27-N. (Russian.) **Phenomenon of "Resorption" of the Diffusion Layer of Chromium-Plated Steel at High Temperatures.** G. N. Dubinin. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 84-87.

Tests on iron, carbon steel and stainless steels at 900 to 1100° C. under vacuum for 10, 30, 60 and 120 hr. (N1, ST)

28-N. (Swedish.) **Diffusion in Metallic Solid Solutions.** U. Landergren. *Jernkontorets Annaler,* v. 138, no. 10, 1954, p. 619-642.

Fick's law of diffusion, the Kirkendall effect, probable mechanism of diffusion in face-centered cubic metals. Graphs, diagrams. 65 ref. (N1)

29-N. Structure of Metals and Alloys After Vacuum Heating. L. I. Shushpanov. *Henry Brutcher, Altadena, Calif., Translation no.* 3304, 13 p. (From *Metallurg,* v. 12, no. 6, 1937, p. 31-36.)

Early Russian study of transformations occurring in plain carbon and low-alloy steels, copper and white iron within temperature range of 1100 to 2200° F. Diagram, micrographs. 6 ref.
(N general, CN, AY, Cu, Al)

30-N. Metallographic Investigation of the Tempering of Quenched High-Carbon Steel. A. P. Gulyaev and M. P. Zel'bet. *Henry Brutcher, Altadena, Calif., Translation no.* 3390, 6 p. (From *Izvestiya Akademii Nauk SSSR,* 1954, no. 3, Mar., p. 83-87.)

Effect of tempering to 210, 390, 480, 570 and 930° F. upon microstructure and microhardness of specimens. Graphs, micrographs, tables. 3 ref. (N8, M27, Q29, CN)

31-N. (French.) **Micrographic Study at High Resolution of the First Stages of Aging of an Aluminum-Copper Alloy.** Raymond Castaing and Gabriel Lenoir. *Comptes rendus,* v. 239, no. 16, Oct. 18, 1954, p. 972-974.

Electron micrographs show characteristic heterogeneities. Micrographs. (N7, Al, Cu)

32-N. (French.) **Lines in High-Chromium Steels.** Berger. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 11, 1954, p. 2106-2111.

Study of inclusions caused by solidification phenomena. Corrective measures are indicated. Table, graph, micrographs. (N12, AY)

33-N. (German.) **Structural Phenomena in the Segregation of Homogenized Aluminum - Zinc - Magnesium Alloys.** Paul Brenner and Margarete Schippers. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 577-583.

Determination of recrystallization and grain-boundary displacements after solution treatment; appearance of a substructure on segregation of the solid solution explained by polygonization and precipitation on subgrain boundaries. Table, graph, micrographs. 13 ref.
(N7, N5, Al, Zn, Mg)

34-N. (German.) **X-Ray Investigations on the Age Hardening of an Aluminum-Copper Alloy With Small-Angle Oscillation Photography.** Volkmar Gerold. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 593-599.

Studies on 5% copper alloy aged for varying periods at room temperature to 220° C. indicate both room and high-temperature hardness

zones. Graph, tables, diagram, diffractograms. 22 ref. (N7, Al, Cu)

35-N. (German.) **On the Structure of the States Arising From the Age Hardening of an Aluminum-Copper Alloy.** Volkmar Gerold. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 599-607.

Lattice models indicate a monoatomic layer of copper atoms parallel to (001); relationship of high-temperature age hardening to precipitation of theta" and theta-prime transition phases. Graphs, diagrams, tables, diffractograms. 18 ref. (N7, Al, Cu)

36-N. (Book—French.) **(Structural Modifications of Metallic Crystals and Their Influence on the Kinetics of Structural Hardening of Aluminum Solid Solutions.) Les modefications de structure du cristal metallique et leur influence sur la cinetique du durcissement structural des solutions solides d'aluminium.** Aurel Berghezan. 95 p. 1953. Magasin C.T.O.: Ave. de la Porte-d'Issy, Paris, France. 1200 fr.

Symmetrical irregularities and imperfections which are primarily responsible for mechanical and physical properties of metals. (N7, M26, Al)

37-N. Evidence for Order in the Mn-Mo Sigma Phase. B. F. Decker, R. M. Waterstrat, and J. S. Kasper. *Journal of Metals,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954, p. 1406-1407.

X-ray scattering factors and geometrical considerations indicate the sigma phase is ordered. Tables. (N10, M26, Mn, Mo)

38-N. (French.) **Contribution to the Study of Recrystallization of Uranium in the Alpha Phase. Typical Data Relating to the Recrystallization and Growth of Alpha Uranium Grains.** M. Englander. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 758-770.

Relation between evolution of average recrystallized grain size, cold work ratio, temperature and annealing time. Micrographs, tables, refractograms, graphs. 7 ref. (N5, U)

39-N. (German.) **Effect of Surface Tension on the Formation of Graphite in Cast Iron.** Kurt Grütter and Borut Marincek. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 447-453.

Experiments show that shape of graphite depends on the surface tension. Table, micrographs. 14 ref. (N8, P10, CI)

40-N. (German.) **The Pearlite in Chromium Steel With 0.4% C and 3.5% Cr.** Angelica Schrader. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 465-474.

TTT-studies on orientation and structure. TTT diagram, micrographs. 10 ref. (N8, AY)

41-N. (German.) **Process of Formation of the Sigma Phase in Steel With 18% Cr, 2% Mn, and 10% Ni.** Franz Braumann and Hans Krächter. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 479-486; disc., 486-488.

Magnetic, microscopic and X-ray study; effect of cold work on sigma phase formation. Graphs, micrographs, diagram. 2 ref. (N6, SS)

42-N. (German.) **Calorimetric Investigation of an Intermediate-Stage Transformation.** Otto Krisement and Franz Wever. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 489-498.

Study of isothermal decomposition of austenite of a steel with 1.2% C and 3.8% Mn at 280 to 460° C. Kinetics of transformation. Diagrams, graphs, micrograph. 19 ref. (N8, AY)

43-N. (German.) **TTT-Diagrams on Cast Iron Contribute to the Understanding of the Mechanism of Isothermal Transformation.** A. de Sy. *Giesserei,* v. 41, no. 22, Oct. 28, 1954.

Method of determining S-curves; evaluation of TTT diagrams; mechanism of isothermal transformation. Tables, photographs, graphs, micrographs. (N8, CI)

44-N. (German.) **Contribution to the Age-Hardenability and Recrystallization of Copper-Cobalt-Manganese Alloys.** K. L. Dreyer. *Metall,* v. 8, nos. 21-22, Nov. 1954, p. 847-849.

Effect of temperature and time on the hardness of 13 copper alloys. Table, graphs. 3 ref. (N7, N5, Q29, Cu)

45-N. (Italian.) **Transformation of Residual Austenite in Tool Steels by Sub-Zero Treatment.** P. Lombardi and U. Marturano. *Metallurgia italiana,* v. 46, no. 9, Sept. 1954, p. 317-322.

Advantages gained by combined low temperature and drawing treatments. Data show no correlation between hardness and cutting capacity. Graphs, table. 11 ref. (N8, J2, Q29, TS)

46-N. (Russian.) **Microscopic Investigation of Mutual Diffusion of Metals in Nonuniform Porous Bodies.** Ia. E. Geguzin and Pek-En-Gin. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 9, Sept. 1954, p. 1626-1630 + 3 plates.

Experimental data on nickel-cobalt, cobalt-iron, copper-platinum and cobalt-platinum systems. Micrographs, tables. 8 ref.
(N1, Co, Fe, Cu, Pt, Ni)

47-N. (Russian.) **Aging of High-Carbon Steel.** D. S. Kazarnovskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 9, Sept. 1954, p. 1636-1643.

Low sensitivity of 0.60% carbon steels to aging explained by retarding of nitrogen diffusion by the carbon. Tables, graphs, micrographs. 10 ref. (N7, CN)

48-N. Diffusion Between Electrodeposited Copper and Zinc Alloy Die Castings. C. W. Roberts. *Metallurgia,* v. 50, no. 301, Nov. 1954, p. 207-212.

Effects of surface condition, cleaning procedure, temperature and time on blistering of chromium plated zinc alloys. Tables, micrographs, graphs. 3 ref.
(N1, Zn, Cr, Cu)

49-N. (Russian.) **Graphitization in the Epsilon-Phase of the Nitrided Layer of High-Carbon Steels.** A. N. Serov. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 10, Oct. 1954, p. 1798-1801.

Chemical composition of steels. Depth of layer of epsilon phase and change in dimensions of cross section. Hardness of layer. Graph, tables, micrographs. 2 ref.
(N8, Q29, J28, CN)

50-N. (Russian.) **Diffusion in Interstitial Alloys.** A. A. Smirnov. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 10, Oct. 1954, p. 1802-1811.

Formulas for determining average height of potential barriers for passage of interstitial atoms; coefficient of diffusion of interstitial atoms. Graphs, diagram. 5 ref.
(N1)

51-N. (Russian.) **Transformations in Iron-Carbon Alloys During Heating by Electric Current.** V. N. Gridnev. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 10, Oct. 1954, p. 1812-1822.

Effect of rate of heating on position of critical points. Graphs, micrographs. 3 ref. (N8, CN)

52-N. Morphology of the Growth of Isolated Crystals in Cathodic Metal Deposits. Hellmuth Fischer and Heinz Felix Heiling. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 7, v. 31, 1954, 13 p. + 4 plates.

Deposition of silver confirmed that growth layers lie parallel to lines of current. Requirements for formation of FI-type isolated crystals. Tables, photographs, micrographs. 18 ref. (N14, Ag)

53-N. The Influence of Annealing on the Structure and Hardness of Electrodeposited Chromium. C. P. Brittain and G. C. Smith. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 10, v. 31, 1954, 7 p. + 2 plates.

Grain size increased and hardness decreased with increase of annealing temperature from 450 to 700° C. Graphs, micrographs. 4 ref.
(N3, J23, Q29, Cr)

54-N. The Diffusion of Chromium and Other Elements Into Non-Ferrous Metals. R. L. Samuel and N. A. Lockington. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 11, v. 31, 1954, 14 p. + 2 plates.

Diffusion of chromium, molybdenum and tungsten into nickel and its alloys produces coatings with good corrosion resistance. Diagram, graphs, tables, micrographs. 7 ref.
(N1, L general, Cr, Mo, W, Ni)

55-N. Continuous-Cooling Transformations in Steels. G. Mayer. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 197-200.

Special dilatometric technique for studying transformations at ordinary heat treating cooling rates. Diagram, graphs. 5 ref. (N8, ST)

56-N. The Graphitization of Steel at Subcritical Temperatures. R. H. Hickley and A. G. Quarrell. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 337-346 + 2 plates.

Effects of previous history, chemical composition and nature of heating atmosphere on rate of graphite formation at 660° C. for 15 plain carbon steels. Tables, graphs, micrographs. 18 ref. (N8, CN)

57-N. Some Aspects of the Alpha-Gamma Transformation of High-Purity Iron. P. R. Pallister. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 346-348.

Specific heat, thermal analysis and thermal e.m.f. measurements show that minimum alpha→gamma and maximum gamma→alpha transformation temperatures are both close to 908.5° C. Graphs. 9 ref. (N6, Fe)

58-N. Concentration Contours in Grain Boundary Diffusion. R. T. P. Whipple. *Philosophical Magazine,* v. 45, 7th ser., no. 371, Dec. 1954, p. 1225-1236.

Derivation of formulas for concentration in a poorly diffusing half-space by a thin well-diffusing slab, at different times after the edge of the half-space has suddenly been

raised from zero to unit concentration. Graphs. 3 ref. (N1)

59-N. (English.) **On the Solid Solubility of Silver in Aluminium.** Kenichi Hirano and Yutaka Takagi. *Physical Society of Japan, Journal,* v. 9, no. 5, Sept.-Oct. 1954, p. 730-735.

Determination by changes of specific heat and electrical resistance during heating. Graphs. 16 ref. (N12, Ag, Al)

60-N. (English.) **The Geometric Coalescence Mechanism in Grain Boundary Migration.** John P. Nielsen. *Rudarsko-metalurski zbornik,* 1954, no. 2, p. 105-120.

Concept of geometrical coalescence as related to grain structure and recrystallization. Diagrams, graphs, micrograph. 9 ref. (N3, N5)

61-N. (Czech.) **Effect of Various Factors on the Amount of Hydrogen in Aluminum-Silicon Alloys.** Max. Klima. *Slévarenstvi,* v. 2, no. 8; *Prace Ceskoslovenského Vyzkumu Slévarenského,* v. 1, no. 8, Aug. 1954, p. 57-60.

Vacuum extraction method for evaluating gasification of aluminum alloys. Diagrams, photographs, tables, graphs. (N15, Al, Si)

62-N. (French.) **Porosity Observed in the Kirkendall Effect.** Jean Blin. *Comptes rendus,* v. 239, no. 20, Nov. 15, 1954, p. 1293-1295.

Investigates existence of cavities in the alloy containing the metal that diffuses the faster by studying the diffusion of X-rays where the cavities are in formation. Table, graph. 6 ref. (N1, Zn, Cu)

63-N. (French.) **Some Cases of Nonprovoked Polygonization of Industrial Alloys.** Pierre A. Jacquet and Adrienne R. Weill. *Comptes rendus,* v. 239, no. 21, Nov. 22, 1954, p. 1384-1386.

Typical examples of polygonization in two cast copper-base industrial alloys and a hot forged, homogenized and aged aluminum alloy. Micrographs. 4 ref. (N5, Cu, Al)

64-N. (French.) **Study of Martensitic Transformation in the Vicinity of the Ms Point.** Jean Philibert and Charles Crussard. *Comptes rendus,* v. 239, no. 22, Nov. 29, 1954, p. 1493-1495.

Transformation kinetics in the upper region of the Ar^{111} of a superhardened steel. Relationships between stabilization and chain reactions (quasi-simultaneous formation of bundles of martensitic plates). Graphs. 2 ref. (N8, AY)

65-N. (French.) **Mechanism of the Nucleation of the Annealing Graphite of Prehardened White Cast Irons.** Jacques Pomey, André Véragen, and Pierre Mathon. *Comptes rendus,* v. 239, no. 22, Nov. 29, 1954, p. 1495-1497.

Determination of hardening and isothermic tempering conditions leading to a high number of graphite nuclei. Differential thermomagnetic study of the nature of carbides resulting from hardening and their evolution by tempering. Table, graphs. 1 ref. (N2, N8, CI)

66-N. (German.) **Structure and Properties of the Cobalt-Nickel-Manganese Alloys.** Werner Köster and Hans Rittner. *Zeitschrift für Metallkunde,* v. 45, no. 11, Nov. 1954, p. 639-642.

Shows that recrystallization of ternary cobalt-nickel-manganese alloys is to be expected because of the nickel-manganese phase. Graphs. 7 ref. (N5, Co, Ni, Mn)

67-N. (Russian.) **Problem of the Mechanism of Artificial Aging of Aluminum Alloys.** V. M. Berezhiani. *Doklady Akademii Nauk SSSR,* v. 98, no. 5, Oct. 11, 1954, p. 773-775.

Investigates effects of time and temperature of aging on the hardness of aluminum-copper and aluminum-copper-magnesium alloys. Graphs, table. 8 ref. (N7, Q29, Al, Cu, Mg)

68-N. (Russian.) **Continuous Solid Solutions of Metallic Compounds of FeCr and FeV.** I. I. Kornilov and N. M. Matveeva. *Doklady Akademii Nauk SSSR,* v. 98, no. 5, Oct. 11, 1954, p. 787-790.

Experimental data on transition from alpha solid solutions in the ternary iron-chromium-vanadium system to sigma solid solutions between FeCr and FeV compounds. Graphs. 9 ref. (N12, N6, Fe, Cr, V)

69-N. (French.) **Experimental Research on the Microstructure of the Polycrystalline Solid Solution Copper-Zinc 65/35 Very Slightly Deformed in Tension, and Its Evolution During Annealing Between 200 and 600° C. II. A Study of the Annealing Microstructure.** P. A. Jacquet. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 752-796.

Simple, but highly sensitive and accurate technique of etching alpha copper-zinc alloy permitted study of glide inside grains and evolution of microstructure up to the end of polygonization. Photograph, micrographs, refractograms. 35 ref. (M27, N5, J23, Q24, Cu, Zn)

70-N. (English.) **Relaxation Effects in Solid Solutions Arising From Changes in Local Order. II. Theory**

of the Relaxation Strength. A. D. LeClaire and W. M. Lomer. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 731-742.

Calculated and measured values of relaxation strength agree for alpha copper-zinc, alpha silver-zinc and copper-aluminum alloys. Tables, graph. 20 ref.
(N10, Q3, Cu, Zn, Ag, Al)

71-N. (English.) **A Relaxed Vacancy Model for Diffusion in Crystalline Metals.** N. H. Nachtrieb and G. S. Handler. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 797-802.

Mechanism for diffusion in solid metals proposed in which rate-limiting atom movements occur within small regions of disorder in the crystal. Disordered regions average 12 to 14 atoms which have relaxed inward around a lattice vacancy, and have an energy content about the same as the equivalent number of atoms in the liquid state. Tables, graphs. 6 ref. (N1)

72-N. (English.) **Thermal Diffusion in Solid Alloys.** L. S. Darken and R. A. Oriani. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 841-847.

Vacancy mechanism to explain migration of interstitial solutes to higher temperature regions of alpha iron-nitrogen, alpha iron-carbon and copper-gold alloys. Diagrams, graphs, tables. 16 ref.
(N1, Fe, Cu, Au)

73-N. (English.) **Electron-Optical Observations of Transformations in Eutectoid Steel.** G. W. Rathenau and G. Baas. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 875-883.

Transformation of austenite into pearlite and vice versa studied on pure eutectoid steel by direct observation, applying electron-emission microscopy. Pearlite colonies generally cross austenite grain boundaries. Strain-induced grain-boundary migration occurs within the austenite. Stimulation of austenitic twins was observed on austenitizing partially transformed austenite. Diagrams, micrographs. 10 ref. (N8, CN)

74-N. (English.) **The Superlattice in Sendust.** R. I. Garrod and L. M. Hogan. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 887-888.

X-ray studies show that iron alloys containing 8 to 11% silicon and 4.5 to 8% aluminum retain a superlattice of the Fe_3Al type after a wide variety of heat treatments. Table. 5 ref.
(N10, J general, SG-n, Fe, Al, Si)

75-N. **Diffusion of Cobalt in Molybdenum.** E. S. Byron and V. E. Lambert. *Electrochemical Society, Journal,* v. 102, Jan. 1955, p. 38-41.

Coefficients determined in order to estimate minimum sintering times for complete homogenization for powder metallurgy applications. Tables, graphs, micrographs. 6 ref.
(N1, H15, Co, Mo)

76-N. **Topochemical Reactions on Electrodeposits.** Artur Kutzelnigg. *Electroplating and Metal Finishing,* v. 7, Dec. 1954, p. 454-457.

Reactions in which the deposit is converted into an insoluble adherent reaction product, and those in which the deposit is dissolved leaving a nonmetallic film exhibiting original structure. Micrographs, diagrams, graphs. 9 ref.
(N12, Cr, Ni, Ag)

77-N. **Some Recent Work in Physical Metallurgy in Sweden.** Erik Rudberg. *Metal Progress,* v. 67, Jan. 1955, p. 104-107.

Incompleted reactions in solid alloys—metastability—are under intense study, including bainitic hardening of alloy steels, martensitic hardening of 18-8 stainless, and earliest stages of precipitation hardening in nonferrous alloys. Photograph, micrographs. (N8, N7)

78-N. **A Method of Controlling Quenching in Baths.** (Digest of "Factors Influencing the Isothermal Transformation of Austenite in the Intermediate Range (Bainite Range). II.", by Otto Schaaber; *Draht (English Ed.),* 1954, Apr., p. 29-39.) *Metal Progress,* v. 67, Jan. 1955, p. 182 + 5 pages.

Shows that mechanical properties of bainite are impaired by presence of propearlitic ferrite; difficulty of preventing bainite transformation during martempering. (N8, J26, ST)

79-N. (German.) **Precipitation in Plastically Deformed Solid Solutions.** Hermann Schumann. *Metallurgie und Giessereitechnik,* v. 4, no. 11, Nov. 1954, p. 474-484.

Differences between precipitations from supersaturated nondeformed and deformed solid solution alloys. Theoretical considerations. Diagrams, graphs, tables, micrographs. 28 ref. (N7)

80-N. (Polish.) **Coagulation of Eutectoidal Cementite in Pearlitic Malleable Cast Iron.** J. Raczka. *Prace Instytutu Odlewnictwa,* v. 3, no. 1, 1953, p. 28-40.

Effects of silicon and manganese contents, rate of cooling, tempera-

ture and soaking time. Tables, graphs, micrographs. 6 ref. (N8, CI)

81-N. (Russian.) **Method of Investigation of Phase Transformation in Non-Metallic Compounds (Ferrites), and in Metal Alloys.** M. V. Dekhtiar, L. M. Dekhtiar and T. A. Iurina. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia,* v. 18, no. 4, July-Aug. 1954, p. 502-510.

Instrumentation and procedure based on principle of electrical resistance and magnetic permeability. Graphs, diagrams. 11 ref. (N6, M23, Fe, W, Ni, Zn, Al, ST, AY)

82-N. (Russian.) **Temperature Conditions of Phase Transformations During Induction Heating of Steel.** I. N. Kidin and M. G. Kogan. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 11, Nov. 1954, p. 2011-2024.

Theoretical analysis of the kinetics of the process and the effect of pearlite-austenite phase transformations on such heating. Graphs, oscillogram. 16 ref. (N8, J2, SS)

83-N. Equilibrium Between Titanium in Liquid Iron and Titanium Oxides. R. L. Hadley and G. Derge. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 55-60.

Study of iron-titanium alloys up to 50% titanium shows first a decrease then a rapid increase of oxygen solubility with increasing titanium. Graphs, tables, micrographs, diagram. 16 ref. (N12, P12, Ti, Fe)

84-N. Sulphur Pressure Measurements of Molybdenum Sesquisulphide in Equilibrium With Molybdenum. C. Law McCabe. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 61-63.

Molybdenum sesquisulfide is in equilibrium with molten molybdenum at 1100° C. Tables, refractograms, graph. 6 ref. (N12, P12, Mo)

85-N. Martensite Formation in Powders and Lump Specimens of Ti-Fe Alloys. D. H. Polonis and J. Gordon Parr. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 64.

Further tests confirm differences in structure and hardness and explain them on basis of size effects. Graph, micrographs. 4 ref. (N9, Q29, Ti, Fe)

86-N. Low Pressure Hydrogen Solubility in Uranium. H. C. Mattraw. *Journal of Physical Chemistry,* v. 59, Jan. 1955, p. 93-94.

Work done at 295° C. Table. 3 ref. (N12, U)

87-N. Exaggerated Grain Growth in Extrusions. D. H. Locke. *Metallurgia,* v. 50, no. 302, Dec. 1954, p. 268-275.

Excessively large grains are caused by a combination of complex flow and subsequent heat treatment. Possibilities of control and need of further study. Photographs, diagrams. 48 ref. (N3, F24, Al, Cu, Sn)

88-N. (Czech.) **Solution of Graphite in Austenite.** Robert Kamensky. *Slévarenstvi,* v. 2, no. 12, Dec. 1954, p. 356-358.

Solution rate is dependent on rate of filling cavities resulting from the solution of the graphite; mechanism of the filling process. Micrograph, table, graph. 7 ref. (N8, ST)

89-N. (German.) **The Carbides of Columbium.** G. Brauer, H. Renner and J. Wernet. *Zeitschrift für anorganische und allgemeine Chemie,* v. 277, no. 5, Dec. 1954, p. 249-257.

Preparation and X-ray studies; solubility of carbon in metallic columbium. Tables, diagram, powder diagram, graphs. 7 ref. (N12, H general, Cb, C)

90-N. (Russian.) **Influence of Manganese on the Self-Diffusion of Iron.** P. L. Gruzin, B. M. Noskov and V. I. Shirokov. *Doklady Akademii Nauk SSSR,* v. 99, no. 2, Nov. 11, 1954, p. 247-250.

Temperature dependence of the coefficient of self-diffusion of iron in gamma-phase of iron-manganese alloys. Diagrams, tables. 7 ref. (N1, Fe, Mn)

91-N. (Russian.) **Particular Solution of a Problem for the Diffusion Boundary Layer in the Diffusor.** V. P. Shestopalov. *Prikladnaia Matematika i Mekhanika,* v. 18, no. 6, Nov.-Dec. 1954, p. 753-756.

Mathematical treatment. 5 ref. (N1)

92-N. Structure and Properties of Ti-C Alloys. H. R. Ogden, R. I. Jaffee and F. C. Holden. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 73-80.

Heat treatments and resulting mechanical properties of titanium-carbon and titanium-carbon-oxygen al-

loys. Graphs, tables, micrographs. 5 ref.
(M general, J general, Q general, Ti)

93-N. Solution Rate of Solid Aluminum in Molten Al-Si Alloy. C. M. Craighead, E. W. Cawthorne and R. I. Jaffee. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 81-87.

Static tests with 2S aluminum at 585, 595, 600, 610 and 625° C. in baths containing 10.5, 11.8, 12.5, and 14% silicon show linear relation between time of immersion and depth of penetration at a given temperature. Solution rate increases with temperature. Graphs, tables, diagram, photograph, micrographs. 2 ref. (N12, Al, Si)

94-N. Mobilities in Diffusion in Alpha Brass. G. T. Horne and R. F. Mehl. *Journal of Metals,* v 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 88-99.

Diffusion coefficients, mobilities and Kirkendall effect at various concentrations of the alpha-phase. Tables, diagram, graphs. 20 ref. (N1, Cu, Zn)

95-N. Effect of Alpha Solutes on the Heat-Treatment Response of Ti-Mn Alloys. H. R. Ogden, F. C. Holden and R. I. Jaffee. *Journal of Metals,* v 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 105-112.

Substitutional additions, such as aluminum, decrease rate of nucleation and growth of alpha from beta but interstitials such as carbon and nitrogen increase the rate. Tables, graphs, micrographs. 7 ref. (N2, J general, Ti)

96-N. Autoradiography Determination of the Self-Diffusion of Silver. Helmut Krueger and Herbert N. Hersh. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 125-126.

This method gave results in satisfactory agreement with previous data. Table, graph. 7 ref. (N1, Ag)

97-N. Solubility and Decomposition Pressures of Hydrogen in Alpha-Zirconium. Earl A. Gulbransen and Kenneth F. Andrew. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 136-144.

Thermodynamic quantities determined by measurement of decomposition pressures over a broad range of composition and temperature. Graphs, tables. 17 ref. (N12, P12, Zr)

98-N. Effects of Tensile Stress on the Austenite to Ferrite Transformation in Eutectoid Steel. L. S. Birks and E. F. Bailey. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 179-182.

X-ray diffraction study shows tensile stress accelerates equilibrium conditions and may cause precipitation of large carbides. Photograph, micrographs, graphs. 3 ref. (N8, Q23, CN)

99-N. Some Characteristics of the Isothermal Martensitic Transformation. C. H. Shih, B. L. Averbach and Morris Cohen. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 183-187.

Studies on transformation rates and mechanisms in iron-nickel-manganese and iron-manganese-carbon alloys. Tables, graphs, micrograph. 10 ref. (N8, Fe, Mn, Ni)

100-N. Study of the Effect of Boron on the Decomposition of Austenite. C. R. Simcoe, A. R. Elsea and G. K. Manning. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 193-200.

Concentration of boron at lattice imperfections accounts for its hardenability effects in steels. Tables, graphs, micrographs. 15 ref. (N8, J26, AY)

101-N. Dispersion Hardening of Copper-Chromium Alloys. W. R. Hibbard, Jr., and E. W. Hart. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 200-202.

Effects of amount and characteristics of chromium-rich precipitate on flow characteristics. Tables, micrographs, graphs. 13 ref. (N7, Q24, Cu, Cr)

102-N. Isothermal Austenite Grain Growth. H. B. Probst and M. J. Sinnott. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 215-216.

Effects of temperature, time at temperature and prior grain size on behavior of vacuum-melted electro-

lytic iron. Graphs, table. 11 ref. (N8, Fe)

103-N. (English.) **On the Theory of Transformation Stress.** Kotaro Honda and Mizuho Sato. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 847-857; disc., p. 857.

Theory explains irreversibility, such as the hysteresis loop, in the A_3 transformation of pure iron. Graphs. (N6, Q25)

104-N. (English.) **Reactivity of Crystal Interfaces.** B. Chalmers. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 863-865; disc., p. 865-866.

Free energy conditions between crystals of different phases, solid-liquid interfaces and crystals of the same phase but of different orientation; relation to precipitation reactions and intergranular corrosion. 12 ref. (N7, P12, R2)

105-N. (French.) **Effect of Gas Adsorption on the Cessation of Unbalanced Stages by Annealing of Tempered Alloys.** Hubert Forestier and Joseph Maurer. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 881-887; disc., p. 887.

Investigation of the surface transformation of a martensite structure in 0.8% carbon steel, and the surface hardening of beryllium bronze. Graphs. 6 ref. (N8, J23, CN, Cu)

106-N. (French.) **The Effect of Substitutions on the Properties of Cementite.** A. Michel. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 929-940; disc., p. 940.

Investigation on production, thermomagnetic cycle and thermal evolution of pure cementite; effects of nickel, cobalt, sulfur and nitrogen additions. Graphs. 15 ref. (N8, ST)

107-N. (German.) **Effect of Alternating Stresses on Diffusion and Segregation Processes in Unalloyed Steels.** Hermann Schenck and Eugen Schmidtmann. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 579-588.

Carburizing, nitriting and chromizing tests accompanied by pulsating stresses or ultrasonic frequencies show that both increase the diffusion of carbon, nitrogen, and chromium; alternating stresses accelerate age hardening. Photograph, graphs, micrographs. 2 ref. (N1, N7, CN)

108-N. (German.) **Electron Microscopic Investigations of the Crystal Growth of Oxides.** G. Pfefferkorn. *Mikroskopie,* v. 62, no. 2, Dec. 1954, p. 109-115.

Confirms theory of crystal growth through surface diffusion; provides an insight on mechanism of growth and surface structure of oxide coatings. Micrographs. (N1, M26, Ni, Cu, Mo, Fe, Zn)

109-N. (German.) **The Reaction of Iron With Liquid Aluminum.** Erich Gebhardt and Werner Köster. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 921-928; disc., p. 928.

Effects of various amounts of zinc on iron-aluminum reactions. Micrographs, photographs, graphs. (N12, Fe, Al)

110-N. (German.) **Self-Diffusion, Plasticity and Transformation in Brass With 58% Copper.** Günter Wassermann. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 957-962.

Investigation on 1-mm. drawn wires, dipped into liquid air and repeatedly brought into room temperature. Partial interpretation of results. Graphs, diagrams. 7 ref. (N1, Q23, Cu, Zn)

111-N. (German.) **Processes of Sintering and Diffusion in the System Nickel-Molybdenum-Iron.** F. Benesovsky. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 963-978.

Interpretation of the sintering process in the nickel-molybdenum-iron system on the basis of model experiments. Determination of technical properties and structures. Graphs, micrographs. 25 ref. (N1, H15, Ni, Mo, Fe)

112-N. (German.) **Solid Solution Formation in High-Melting-Point Hard Materials (Cermets).** R. Kieffer. Paper from "International Symposium

on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 1001-1026; disc., p. 1026.

Diffusion processes during sintering; type and purpose of the formation of solid solutions; properties; production. Nitride-carbide, boride-boride, and silicide solid solutions. Tables, graphs, diagrams, micrographs. 38 ref. (N12, H15)

113-N. (Russian.) **Transformation of Residual Austenite in R9 Steel During Rapid Heating.** G. F. Golovin and E. P. Mogilevskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 8, Aug., p. 119-122.

Effect of temperature and rate of induction heating on hardness and amounts of residual austenite in tempering process. Micrographs, graph. 2 ref. (N8, J2, TS)

114-N. (Russian.) **Determination of the Correlation Between Mobility and the Coefficient of Diffusion for the Photovacancies in Electronic Germanium.** S. M. Ryvkin. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 12, Dec. 1954, p. 2136-2149.

Diffusion drift and concentration distribution of "nonequilibrium", "nonbasic" current carriers for a partly illuminated semiconductor. Graphs, table, diagrams. 9 ref. (N1, Ge)

115-N. (Russian.) **Effect of Induction Heating on the Structural Transformations of High-Chromium Toolsteel.** E. P. Mogilevskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 12, Dec. 1954, p. 2202-2208.

Effects of temperature and rate of heating on hardness and amount of residual austenite. Tables, graphs. 1 ref. (N8, J2, TS, Cr)

116-N. Surface Nucleation in the Recrystallization of Aluminium Single Crystals. C. D. Graham and R. Maddin. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 169-172 + 1 plate.

Explanation of surface nucleation effect in terms of piled-up dislocations. Diagram, photographs. 10 ref. (N5, N2, Al)

117-N. The Solubility of Vanadium in Gold. D. Summers-Smith. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 189-190.

X-ray studies show maximum solubility is 17.5 at. % at 970° C. and 13 at. % at room temperature. Graphs. 4 ref. (N12, V, Au)

118-N. Thermodynamics of Carbon Dissolved in Iron Alloys. I. Solubility of Carbon in Iron-Phosphorus, Iron-Silicon, and Iron-Manganese Melts. E. T. Turkdogan and L. E. Leake. **II. Influence of Silicon on the Activity Coefficient of Carbon Dissolved in Molten Iron.** E. T. Turkdogan. *Iron and Steel Institute, Journal,* v. 179, Jan. 1955, p. 39-45.

Generalization of effects of alloying elements on carbon solubility; factors responsible for these effects. Diagram, graphs, table. 24 ref. (N12, P12, Fe)

119-N. Nucleation in Transformations in the Irreversible Iron-Nickel Alloys. G. Masing and O. Nickel. *Henry Brutcher Translation no.* 3348, 21 p. (Slightly condensed from *Archiv für das Eisenhüttenwesen,* v. 24, nos. 3-4, 1953, p. 143-151.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 197-N, 1953. (N2, P12, M24, Fe, Ni)

120-N. On the Solubility of Iron in Liquid Slags. P. M. Shurygin and O. A. Esin. *Henry Brutcher Translation no.* 3415, 6 p. (From *Doklady Akademii Nauk SSSR,* v. 95, no. 5, 1954, p. 1043-1045.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 223-N, 1954. (N14, Fe)

121-N. Solubility of Oxygen in Nickel-Chromium and Iron-Nickel-Chromium Melts. S. V. Bezobrazov and A. M. Samarin. *Henry Brutcher Translation no.* 3417, 6 p. (Abridged from *Izvestiya Akademii Nauk SSSR, OTN,* 1953, no. 12, Dec., p. 1790-1796.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 306-N, 1954. (N12, Fe, Ni, Cr)

122-N. (English.) **Dependence of the Intermetallic Diffusion Coefficient Upon Concentration.** Joji Mizuno, Shiro Ogawa and Tokutaro Hirone. *Physical Society of Japan, Journal,* v. 9, no. 6, Nov.-Dec. 1954, p. 961-966.

Diffusion coefficients were obtained by X-ray examination of electrodeposited coatings. Graphs, tables. 9 ref. (N1, L17, Cu, Ni)

123-N. (French.) **Incubation Period of the Martensitic Transformation.** Jean Philibert. *Comptes rendus,* v. 239, no. 23, Dec. 8, 1954, p. 1634-1636.

Study by isothermal dilatometry of transformation at low temperature on a hypereutectoid steel. Graphs. (N8, AY)

124-N. (French.) **General Characteristics of the Alpha⇌Sigma Transformation of Iron-Chromium Alloys.** Paul Bastien and Gilles Pomey. *Comptes rendus,* v. 239, no. 25, Dec. 20, 1954, p. 1797-1799.

High-purity alloys of equal composition which transform completely into the sigma-phase. Micrographs. (N8, Fe, Cr)

125-N. (French.) **Existence of an Order-Disorder Transformation in Ferrochromium Alloys Approaching Equi-Atomic Composition.** Paul Bastien and Gilles Pomey. *Comptes rendus,* v. 239, no. 23, Dec. 8, 1954, p. 1636-1638.

Thermal analysis by magnetometry and dilatometry. Graphs. 1 ref. (N10, Fe, Cr)

126-N. (German.) **Acceleration of the Austenite-Pearlite Transformation of a Case Hardening Steel With 2% Chromium and 2% Nickel by an Addition of Vanadium.** Sepp Ammareller and Paul Opel. *Stahl und Eisen,* v. 75, no. 2, Jan. 27, 1955, p. 65-69.

Time-temperature-transformation curves and case hardening tests show vanadium reduces tendency toward cracking. Graphs, micrographs. (N8, AY)

127-N. (German.) **Age Hardening of Alloys.** H. Knapp. *Umschau in Wissenschaft und Technik,* v. 55, no. 2, Jan. 15, 1955, p. 38-40.

Atomic explanation of hardening principle and its part in distinguishing between age and quench hardening. Graphs, X-ray photographs. (N7, Cu, Al, Mg, Ag)

128-N. (Russian.) **Influence of Oxidation of Cast Iron on the Modification Effect.** B. V. Stark and N. K. Nekrasov. *Liteinoe Proizvodstvo,* 1954, no. 9, Dec., p. 18-20.

Relation of microstructure of modified and unmodified cast iron to preliminary oxidation and deoxidation. Effect of amount of silicon under varying conditions. Table, graph, micrograph. 7 ref. (N8, M27, R2, CI)

129-N. Oxygen Solubility and Oxide Phases in the Fe-Cr-O System. D. C. Hilty, W. D. Forgeng and R. L. Folkman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 253-268.

Phase relations at steelmaking temperatures; two new oxides were identified. Graphs, tables, micrographs. 13 ref. (N12, Fe, Cr)

130-N. Solid Solubility of Calcium in Magnesium. Edmund C. Burke. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 285-286.

Quantitative metallographic results agree with Vosskühler's data and suggest that Haughton's values are too high. Micrograph, graphs. 5 ref. (N12, Ca, Mg)

131-N. Recrystallization Characteristics of Superpurity Base Al-Mg Alloys Containing 0 to 5 Pct Mg. E. C. W. Perryman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 369-378.

Isothermal softening and micrographic examination show effects of magnesium on rate of nucleation and growth. Tables, micrographs, graphs. 26 ref. (N2, N5, Al, Mg)

132-N. On the Relationship of Texture Changes of Cold-Rolled Face-Centered-Cubic Metals During Recrystallization. Y. C. Liu and W. R. Hibbard, Jr. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 381-384.

Effects of alloying elements on recrystallization texture of copper alloys. Pole figures. 22 ref. (N5, Cu)

133-N. Preferred Orientations in Beta-Annealed Zirconium. J. H. Keeler and A. H. Geisler. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 395-400.

Transformation textures are strongly dependent on the beta-annealing temperature. Tables, pole figures. 15 ref. (N5, Zr)

134-N. Decomposition of Beta Titanium. Franz R. Brotzen, Edward L. Harman, Jr., and Alexander R. Troiano. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 413-419.

Kinetics and nature of precipitation processes in titanium-vanadium alloys. Graphs, tables. 11 ref. (N7, Ti, V)

135-N. Abnormal Grain Growth in Some Aluminum Alloys. T. L. Fritzlen. *Light Metal Age,* v. 12, Feb. 1955, p. 17-19, 41.

Conditions leading to extremely large grains in isolated lots of commercial alloys. Photographs. (N3, Al)

136-N. Effect of Initial Heat-Treatment on the Response of a Steel to Induction Hardening. H. Allsop. *Metal Treatment and Drop Forging,* v. 22, Feb. 1955, p. 47-50, 53.

Effect of initial particle size on

rate of re-solution of carbides in medium-carbon steels. Graph, table, micrographs, photographs.
(N8, J2, CN)

137-N. (English.) **The Solubility of Nitrogen in α-Iron.** H. U. Aström. *Arkiv för Fysik,* v. 8, no. 6, 1954, p. 495-503.

Relaxation and calorimetric measurements, dependence of relaxation on concentration. Graphs, tables. 9 ref. (N12, Fe)

138-N. (English.) **Investigation of the Critical Shear Stress for Single Crystals of Metallic Solid Solutions. II.** J. O. Linde and Sture Edwardson. *Arkiv för Fysik,* v. 8, no. 6, 1954, p. 511-519.

Critical shear stress increases linearly with solute concentration for dilute solid solutions of copper-base alloys, and the increase, per at. % of solute, varies as the square of corresponding change in lattice parameter. Graphs, tables. 4 ref.
(N12, Q2, Cu, Si, Mn, Ni, Ge, In, Sn, Sb, Au)

139-N. (English.) **Formation Energy of Superlattice in Ni_3Fe. III. Kinetics of the Superlattice at the Formation Stage With Long Range Order.** Shuichi Iida. *Physical Society of Japan, Journal,* v. 10, no. 1, Jan. 1955, p. 9-22.

Studies in steady temperature annealing by direct observation of the heat of evolution and by measurement of specific heat. Graphs, tables. 29 ref. (N10, Ni, Fe)

140-N. (English.) **On the Mechanism of Aging in Aluminium-Silver Alloys. II. Nature of the Guinier-Preston Zone.** Ken-ichi Hirano and Hiroto Sakai. *Physical Society of Japan, Journal,* v. 10, no. 1, Jan. 1955, p. 23-30.

Precipitation from supersaturated solid solution of aluminum containing from 5 to 53 wt. % of silver studied by electrical resistance measurements. Graphs. 15 ref.
(N7, Al, Ag)

141-N. (French.) **Cause for the Stabilization of Austenite in the Martensitic Transformation.** Jean Philibert. *Comptes rendus,* v. 240, no. 2, Jan. 10, 1955, p. 190-192.

Investigation of ferro-nickel containing traces of carbon and nitrogen; interpretation of phenomenon. Graphs. 2 ref. (N8, Ni)

142-N. (German.) **The Eutectic Structure of Strongly Supercooled Aluminum-Copper and Aluminum-Iron Alloys.** E. Scheil and Y. Masuda. *Aluminium,* v. 31, no. 2, Feb. 1955, p. 51-55.

Special apparatus for severe supercooling. Eutectic composition ranges widen with degree of supercooling. Diagram, graphs, micrographs. 8 ref. (N12, Al, Cu, Fe)

143-N. (German.) **Laws of Growth of Coupled Precipitates.** Otto Krisement. *Archiv für das Eisenhüttenwesen,* v. 26, no. 1, Jan. 1955, p. 55-57.

Growth of particles during precipitation of a new phase from a supersaturated solid solution. Zener's growth law. Double reactions; growth process of coupled precipitates. Graphs. 9 ref. (N7)

144-N. (German.) **The Time Law of the Precipitation of New Phases in Solid Solutions.** Bernhard Ilschner. *Archiv für das Eisenhüttenwesen,* v. 26, no. 1, Jan. 1955, p. 59-62.

Nucleus growth as a problem of diffusion. Diffusion fronts of individual precipitates, exponential growth law. Diagrams, graph. 10 ref. (N7)

145-N. (German.) **Columnar Grain Formation After Deformation and Recrystallization.** Friedrich Erdmann-Jesnitzer and Hilde Ahr. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 26-32.

Explanation of large grains with preferred orientation in parts made by cold working from sheets of pure aluminum, aluminum-magnesium alloy and pure zinc. Micrographs, photographs, diagram. 19 ref. (N5, Q24, Al, Mg, Zn)

146-N. (Russian.) **Nature of the Process Limiting the Graphitization Rate of Cast Iron.** M. A. Krishtal. *Doklady Akademii Nauk SSSR,* v. 99, no. 6, Dec. 21, 1954, p. 983-986.

Isotherms for cast irons alloyed with cobalt, silicon and cobalt, and tungsten and silicon. Graphs. 12 ref. (N8, CI, Co, Si, W)

147-N. (Russian.) **Influence of Chromium on the Self-Diffusion of Iron.** P. L. Gruzin. *Doklady Akademii Nauk SSSR,* v. 100, no. 1, Jan. 1, 1955, p. 65-67.

Relation of temperature to coefficients of diffusion for different chromium-iron ratios. Graphs, tables. 4 ref. (N1, Fe, Cr)

148-N. (Russian.) **Isothermal Transformation of Ferrite in High-Alloy Austenitic-Ferritic Alloys.** E. M. Pivnik. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 135-143.

Quenching and aging effects; formation of sigma phase. Tables, diagrams, micrographs. 7 ref.
(N8, N7, SS)

149-N. (Russian.) **Method of Determining the Coefficient of Self-Diffusion of Iron in Alloyed Austenite.** M. A. Krishtal. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 144-148.

Based on decarbonization rate of graphitized cast iron; relation of temperature and silicon content to self-diffusion of iron. Tables. 13 ref. (N1, CI)

150-N. (English.) **The Segregation of Impurities to Grain Boundaries.** W. R. Thomas and B. Chalmers. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 17-21.

Effects of grain orientations and annealing temperature on polonium segregation in lead-bismuth alloys. Micrograph, graphs, table. 16 ref. (N1, Pb, Bi, Po)

151-N. (English.) **Solubility of Cementite in Liquid Iron.** Mats Hillert. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 37-38.

Solubility curves for graphite and cementite in liquid iron intersect at 10° C. below the eutectic temperature. Explanation of solidification characteristics of cast iron. Graphs. 8 ref. (N12, CI)

152-N. (English.) **Lattice and Grain Boundary Self-Diffusion in Cadmium.** E. S. Wajda, G. A. Shirn and H. B. Huntington. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 39-42.

Effect of temperature on diffusion in 99.5% pure crystals. Graphs, tables. 5 ref. (N1, Cd)

153-N. (English.) **Kinetics of Precipitation of Tin From Lead-Tin Solid Solutions.** D. Turnbull and H. N. Treaftis. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 43-54.

Nucleation and growth of cells; construction of cells; effects of cold work on precipitation rate. Diagram, tables, graphs, micrographs. 15 ref. (N7, Sn, Pb)

154-N. (English.) **Theory of Cellular Precipitation.** David Turnbull. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 55-63.

Mechanisms of tin precipitation from lead-tin alloys. Graphs. 17 ref. (N7, Pb, Sn)

155-N. (English.) **The Influence of Grain Boundaries on the Nucleation of Secondary Phases.** P. J. Clemm and J. C. Fisher. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 70-73.

Calculation of critical energy for nucleation of ferrite from austenite at 2, 3 and 4-grain junctions. Diagrams, graph. 3 ref. (N2, ST)

156-N. (English.) **Transition Structure in Lead-Silver Alloys and a Dislocation Mechanism.** R. D. Heidenreich. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 79-86.

Electron metallographic study of alloys with 0.009 to 0.23% silver; dislocation model explains precipitation hardening and the hexagonal transition structure. Graphs, tables, micrographs, diagrams. 9 ref. (N7, M26, Pb, Ag)

157-N. (English.) **Self-Diffusion in Thallium.** G. A. Shirn. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 87-88.

Studies with Tl^{204} as a tracer at 150 to 275° C.; possible diffusion mechanisms. Graphs, tables. 2 ref. (N1, Tl)

158-N. (English.) **The Diffusion of Hydrogen in Iron and Ferritic Steels.** E. W. Johnson and M. L. Hill. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 99-101.

Tests on 99.9% iron show that slowly diffusing hydrogen is a real component of the system and its amount depends on temperature and prior thermal history of the iron. Table. 11 ref. (N1, Fe)

159-N. (English.) **A Possible Explanation of the Stability of Guinier-Preston Zones.** J. Nyström. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 103.

Nucleation and growth of a new phase due to diffusion of a solute. (N2, N1)

160-N. (German.) **On the Hardening of Aluminum-Silver Alloys in Thin Films.** Albert Winkelmann. *Zeitschrift für angewandte Physik,* v. 7, no. 1, Jan. 1955, p. 7-12.

Structural change during precipitation hardening of vapor-deposited aluminum-silver alloys explains segregation of hexagonal gamma phase Ag_2Al. Graphs, diagrams. 10 ref. (N7, Ag, Al)

161-N. (Russian.) **The Shape of Pores Appearing During Mutual Diffusion of Metals.** Ia. E. Geguzin. *Doklady Akademii Nauk SSSR,* v. 100, no. 2, Jan. 11, 1955, p. 255-257 + 1 plate.

Action in alpha-brass, copper-nickel and copper-alpha-brass when heating in a vacuum at 950° C. Micrographs, photograph. 5 ref. (N1, Cu, Ni, Zn)

162-N. (Polish.) **Spontaneous and Accelerated Aging of Steel Wires.** Zygmunt Steininger. *Hutnik,* v. 21, no. 11, Nov. 1954, p. 346-352.

Effects of aging and subsequent surface deformation on tensile and

torsional properties. Tables, graphs. 15 ref. (N7, Q23, Q1, ST)

163-N. (Russian.) **Variations in the Intensity of X-Ray Interference During the Aging of Nickel-Chromium-Titanium-Aluminum Alloy.** G. V. Kurdiumov and N. T. Travina. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 2, Feb. 1955, p. 182-187.

Effects of quenching at 1000° C., followed by aging at 500 to 800° C. Tables, graphs. 7 ref.
(N7, Ni, Cr, Ti, Al)

164-N. (Russian.) **Influence of the Cooling Rate on the Kinetics of the Transformation of Austenite Into Martensite.** A. P. Guliaev and A. P. Akshentseva. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 2, Feb. 1955, p. 299-312.

Data for a chromium-vanadium steel cooled to room and subzero temperature. Tables, graphs, micrographs. 7 ref. (N8, AY)

165-N. The Metastability of Austenite in an 18/8 Cr-Ni Alloy. B. Cina. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 230-239 + 6 plates.

Investigations by metallographic, thermomagnetic and room and high-temperature X-ray diffraction methods. Micrographs, photograph, tables, graphs. 16 ref. (N8, SS)

166-N. The Kirkendall Effect in Metals. Possible Applications to Solve Porosity and Plating Problems. K. Sachs. *Metal Treatment and Drop Forging,* v. 22, Mar. 1955, p. 119-125.

Experimental evidence and theories of diffusion of solid metals. How the formation of diffusion micropores, and the heating of such discontinuities in the lattice, associated with the phenomena, can be applied in considering porosity in powder metallurgy and the plating of alloys. Graphs, table, diagrams. 25 ref. (N1 H11, L general)

167-N. Supercooling of Transformation Process as a Basis for the Martensite Transformation. I-II. E. Houdremont and O. Krisement. *Henry Brutcher Translation Nos.* 3339-3340, 69 p. (Slightly condensed from *Archiv für das Eisenhüttenwesen,* v. 24, nos. 1-2, 1954, p. 53-67.) Henry Brutcher, Altadena, Calif.

Study of forces and mechanisms involved in martensite reactions. Graphs. 37 ref. (N8, ST)

168-N. On the Irreversibility of Iron-Nickel Alloys. E. Scheil. *Henry Brutcher Translation No.* 3349, 20 p. (Slightly condensed from *Archiv für das Eisenhüttenwesen,* v. 24, nos. 3-4, 1953, p. 153-160). Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 198-N, 1953.
(N6, Fe, Ni)

169-N. Metallographic Studies of Hard Chromium Deposits. L. Koch and G. Hein. *Henry Brutcher Translation No.* 3422, 7 p. (From *Metalloberfläche,* v. 7, no. 10, 1953, p. 145-148.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 315-N, 1953.
(N6, Cr, Cu, ST)

170-N. (English.) **Growth of Potassium Halide Crystals From Aqueous Solution.** J. B. Newkirk and G. W. Sears. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 110-111.

Explanation of formation of rods, platelets or parallelepipeds by a new growth mechanism. 4 ref.
(N12)

171-N. (French.) **Supersaturation of Vacancies During Diffusion in Brasses.** André Accary. *Comptes rendus,* v. 240, no. 5, Jan. 31, 1955, p. 519-522.

Determination based on kinetics of formation of microscopic porosities appearing in the zone of diffusion. Micrograph, graphs. 5 ref.
(N1, Cu)

172-N. (French.) **Kinetics of the Martensitic Transformation in a Ferronickel.** Jean Philibert. *Comptes rendus,* v. 240, no. 5, Jan. 31, 1955, p. 529-531.

Effects resulting upon varying the carbon and nitrogen contents. Graphs. 3 ref. (N8, Fe, Ni)

173-N. (French.) **Eutectoid Transformation of a Copper Alloy With 6% Beryllium.** Arunachala Viswanathan. *Comptes rendus,* v. 240, no. 6, Feb. 7, 1955, p. 626-628.

Verifies different methods of transformation by quenching and tempering of copper and beryllium alloys in the beta-phase. 2 ref.
(N9, Cu, Be)

174-N. (French.) **Present State of Metallography of Alloyed Austenites, Particularly in Steels Type 18-8. IV. Austenite Stabilization and Sensitization of Martensite.** Paul Bastien and Jacques Dedieu. *Métaux, Corrosion-Industries,* v. 30, no. 353, Jan. 1955, p. 1-8.

Phenomena in transformation of austenite to martensite. Micrograph, graphs, table. (N8, SS)

175-N. (French.) **Structural Hardening of Aluminum, 4% Copper Alloys.** Adrien Saulnier. *Revue de l'aluminium,* v. 32, no. 217, Jan. 1955, p. 41-46.

Theory of precipitation hardening. Metallographic and X-ray confirmation of the mechanism. Graphs, micrographs. 15 ref.
(N7, Al, Cu)

176-N. (German.) **Present State of Research on the Aging of Mild Steels.** Wolfgang Wepner. *Archiv für das Eisenhüttenwesen,* v. 26, no. 2, Feb. 1955, p. 71-98.

Effect of quenching, aging and recrystallization due to cold working upon mechanical and physical properties, solubility and diffusion; theory of aging and precipitation. Graphs. 123 ref.
(N7, P general, Q general, CN)

177-N. (German.) **Orientation Connections Between Austenite, the Intermediate Stage, and Martensite.** Wilhelm Hofmann and Günter Schuhmacher. *Archiv für das Eisenhüttenwesen,* v. 26, no. 2, Feb. 1955, p. 99-104.

Radiographic investigation of chromium-vanadium steel. Radiographs, diagrams. 9 ref. (N8, AY)

178-N. (German.) **Crystallization of Ledeburite Eutectic.** Erich Scheil and Dieter Pohl. *Archiv für das Eisenhüttenwesen,* v. 26, no. 2, Feb. 1955, p. 105-108.

Significance of silicon content for undercooling; hardness and structures of refined cast iron. Graphs, micrographs. 11 ref.
(N12, M27, Q29, CI)

179-N. (German.) **Oriented Precipitates of Secondary Graphite in Gray Cast Iron.** Wilhelm Hofmann and J. M. Sistiaga. *Archiv für das Eisenhüttenwesen,* v. 26, no. 2, Feb. 1955, p. 109-112.

Occurrence and origin; relation of orientation with austenite; growth of monocrystals from gray iron. Graphs, micrographs, photograph. 6 ref. (N8, CI)

180-N. (German.) **The Equilibrium Between Oxygen and Sulfur in Molten Copper at 1150° C.** Friedrich Johannsen and Ulrich Kuxmann. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 2, Feb. 1955, p. 45-59.

Method and apparatus for measuring solubility of sulfur dioxide; equilibrium reactions over a wide concentration range and at different gas pressures; combining conditions for oxygen and sulfur atoms in the melt. Graphs, diagram, photographs, tables. 20 ref. (N12, Cu)

181-N. (German.) **Nucleus Formation and Rate of Growth During the Recrystallization of Pure Aluminum.** Frank Haessner and Kurt Lücke. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 110-118.

Studies on thin aluminum wire show effects of temperature, time, degree of deformation and amount of impurities. Graph, tables, photograph. 28 ref. (N2, N5, Al)

182-N. (Italian.) **Reactions in the Solid State Between Metal and Inclusions.** R. Zoja. *Metallurgia italiana,* v. 47, no. 1, Jan. 1955, p. 15-18.

Behavior of nonmetallic inclusions in refined ferrochromium, other ferroalloys and steels. Table, graph, micrographs. 7 ref.
(N11, Fe, Cr, ST)

183-N. **Solubility of Oxygen in Liquid Nickel and Fe-Ni Alloys.** Henry A. Wriedt and John Chipman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Mar. 1955, p. 477-479.

Oxygen analyses made on samples from melts made in a 30-lb. induction furnace. Tables, graphs. 13 ref. (N12, Fe, Ni)

184-N. **Some Observations on Isothermal Transformations of Eutectoid Aluminum Bronzes Below Their M_s Temperatures.** R. Haynes. *Institute of Metals, Journal,* v. 83, Mar. 1955, p. 357-358 + 3 plates.

Microstructural changes occurring during transformations. It is suggested that isothermal formation of martensite occurs and that both martensite and the phase from which it forms may transform to eutectoid. Table, micrographs. 5 ref. (N9, Cu-d)

185-N. **The Mechanism of the Irradiation Disordering of Alloys.** G. H. Kinchin and R. S. Pease. *Journal of Nuclear Energy,* v. 1, Feb. 1955, p. 200-202.

Calculations suggesting possible mechanism responsible for the rapid disordering produced in ordered alloys. 6 ref. (N10)

186-N. **Radioactive-Tracer Diffusion Studies.** (Digest of "The Diffusion of Iron in Nickel", by M. B. Neiman, A. Ya. Shinyaev and B. G. Dzantiev; *Doklady Akademii Nauk SSSR,* v. 91, 1953, p. 265-267.) *Metal Progress,* v. 67, Apr. 1955, p. 196.

Previously abstracted from original. See item N-26, 1954.
(N1, Fe, Ni)

187-N. **Process of Formation of Sigma Phase in 18% Cr, 10% Ni, 2% Mo Steel.** F. Braumann and H. Krächter. *Henry Brutcher Translation No.* 3447, 20 p. (From *Archiv für das Eisenhüttenwesen,* v. 25, nos.

9-10, 1954, p. 479-488.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 41-N, 1955. (N6, SS)

188-N. **Formation of Graphite on the Surface of Steel During Heat Treating in Vacuum.** E. Z. Graifer and I. V. Salli. *Henry Brutcher Translation No.* 3469, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 97, no. 4, 1954, p. 663-665.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 430-N, 1954. (N8, Fe, ST)

189-N. (English.) **On the Precipitation Process in Aluminium-Zinc-Magnesium Alloys. I. Al-$Al_2Zn_3Mg_3$ System.** Ken-ichi Hirano and Yutaka Takagi. *Physical Society of Japan, Journal,* v. 10, no. 3, Mar. 1955, p. 187-192.

Existence of two separate processes was confirmed. Graphs. 12 ref. (N7, Al, Zn, Mg)

190-N. (English.) **Precipitation From Solid Solution of Lead in Magnesium.** Ken-ichi Hirano, Hideyo Maniwa, and Yutaka Takagi. *Physical Society of Japan, Journal,* v. 10, no. 3, Mar. 1955, p. 193-197.

Results reveal that aging process is constituted from two discrete reactions. Graphs. 17 ref. (N7, Pb, Mg)

191-N. (French.) **Dilatometric Study of the Alpha $\rightleftharpoons$ Sigma Transformation in Iron-Chromium Alloys.** Paul Bastien and Gilles Pomey. *Comptes rendus,* v. 240, no. 8, Feb. 21, 1955, p. 866-868.

An expansion-temperature diagram of various metastable states established, making it possible to interpret expansion curves encountered in practice. Graphs. (N6, Fe, Cr)

192-N. (German.) **The Process of Flame-Hardening, Represented in the Time-Temperature Transformation Diagram for Continuous Cooling.** Adolf Rose and Leo Rademacher. *Stahl und Eisen,* v. 75, no. 4, Feb. 24, 1955, p. 199-210.

Effect of type and performance of torch and rate of feed on the temperature distribution, process of cooling and hardness penetration. Diagrams, graphs, micrographs. 8 ref. (N8, J2, AY)

193-N. (Russian.) **Diffusion of Antimony and Tin in a Semiconductor Alloy SbZn.** B. I. Boltaks. *Doklady Akademii Nauk SSSR,* v. 100, no. 5, Feb. 11, 1955, p. 901-903.

Temperature relation to diffusion coefficient. Graph. 8 ref. (N1, Sb, Zn)

194-N. **Grains Within Grains.** R. C. Gifkins. *Australasian Engineer,* 1955, Feb., p. 41-49.

History of discovery of various types of subgrains, development of theories and origin traced. X-ray pattern, diagrams, micrographs, photographs. 6 ref. (N2)

195-N. **The Solution of Gases in Liquid and Solid Metals.** A. E. Jenkins. *Australasian Engineer,* 1955, Feb., p. 51-60.

Investigations concerning solubility of gases in metals summarized. Tables, graphs. 65 ref. (N16)

196-N. **Ordering Processes in Cu_3Au.** Fred P. Burns and S. L. Quimby. *Physical Review,* v. 97, ser. 2, Mar. 15, 1955, p. 1567-1575.

Data which describe isothermal time rate of change of electrical resistivity in specimen following quench from temperature above the critical to one below it. Diagram, graphs. 21 ref. (N10, Cu)

197-N. (French.) **Segregation of Foreign Atoms in the Melted Grain Boundaries of High-Purity Aluminum.** Fréderic Montariol. *Comptes rendus,* v. 240, no. 10, Mar. 7, 1955, p. 1087-1089.

Effect of temperature on diffusion of impurities. Micrographs. 3 ref. (N1, Al)

198-N. (French.) **Displaying by Autoradiography the Simultaneous Migration of Grain Boundries and Dissolved Atoms in an Aluminum-Copper Alloy With 0.4% Copper at Temperatures Close to the Melting Point of the Alloy.** Maurice Robert, André Robillard and Paul Lacombe. *Comptes rendus,* v. 240, no. 10, Mar. 7, 1955, p. 1089-1091.

Studies on sheet specimens; diffusion-temperature relationships. Autoradiographs. (N1, Al)

199-N. (French.) **Influence of Impurities on the Polygonization of Aluminum.** Jean Montuelle and Georges Chaudron. *Comptes rendus,* v. 240, no. 11, Mar. 14, 1955, p. 1167-1168.

Study of recrystallization of aluminum of different purities. Micrograph. 2 ref. (N5, Al)

200-N. (French.) **Mechanism of Solidification and Segregations in Phosphorus Cast Irons.** Michel Ferry, Garbrielle Aubrion and Jean-Claude Margerie. *Fonderie,* 1955, no. 109, Feb., p. 4353-4372 + 1 plate.

Detailed study of dendritic segre-

gation in above alloys. Graphs, tables, micrographs. 24 ref. (N12, CI)

201-N. (French.) **Structure Modifications of the Metallic Crystal and Their Influence on the Kinetics of the Structural Hardening of Solid Solutions of Aluminum.** Aurel Berghezan. *Publications scientifiques et techniques du ministére de l'air,* no. 283, 1953, 95 p.

Influence of rate of quenching on hardening kinetics; relation between method of recrystallization prior to quenching and aging of solid solutions; effect of cold hardening immediately after quenching. Diagrams, graphs, micrographs. 88 ref. (N5, N7, J26, Al)

202-N. (French.) **A Radiographic Study of the Influence of Forging Upon the Dendritic Segregation of the Phosphorus in Steel Ingots.** A. Kohn and J. Doumerc. *Revue de métallurgie,* v. 52, no. 3, Mar. 1955, p. 249-257.

By use of the autoradiographic method it was possible to determine the influence of forging and long time annealing upon segregation of phosphorus in the metal. Micrographs, diagram, graph. 3 ref. (N12, F22, ST)

203-N. (German.) **Transformation Behavior and Impact Toughness of Case-Hardened Steels.** Helmut Krainer, Max Kroneis and Reinhold Gattringer. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 131-139; disc., p. 139-140.

TTT-diagrams of steels with different carbon content in hard surface layer; conditions for intermediate annealing for complete transformation of surface zone, transformation zone and core of unalloyed and alloyed steels; effect of hardness treatments on impact strength. Table, graphs, micrographs, diagram. 10 ref. (N8, Q6, ST)

204-N. (German.) **Investigation of Transformation Processes and Segregation Phenomena in Nickel Steels With Magnetic Suspension.** Kurt Hans v. Klitzing and Elfriede Wesselhöft. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 141-144.

Magnetic inhomogeneities in steels revealed by orientation of magnetite particles in surface of metallographic specimens. Micrographs. 7 ref. (N general, M27, AY)

205-N. (German.) **Influence of the Degree of Deformation on the Diffusion Processes in Low-Alloy Copper-Tin-Phosphorus Alloy.** Guido Bassi and Bengt Ström. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 208-209.

Investigation on copper alloy with 0.3% tin and 0.2% phosphorus under different heat treatments. Diagram, micrographs. 3 ref. (N1, Q24, Cu)

206-N. (Russian.) **Use of Isotope C^{14} for the Study of the Diffusion of Carbon in Steel.** P. L. Gruzin, V. G. Kostogonov and P. A. Platonov. *Doklady Akademii Nauk SSSR,* v. 100, no. 6, Feb. 21, 1955, p. 1069-1072.

Test made in austenite and ferrite steels before and after tempering; temperature relation in gamma and alpha-iron. Graphs, tables. 9 ref. (N1, ST)

207-N. (Russian.) **Problem of Diffusion of Arsenic in Steel.** D. S. Kazarnovskii. *Doklady Akademii Nauk SSSR,* v. 100, no. 6, Feb. 21, 1955, p. 1073-1075 + 1 plate.

Microstructure of steels with different arsenic content, after heat treatment; degree of striation. Micrographs, tables. 3 ref. (N1, M27, ST, As)

208-N. (Russian.) **Certain Peculiarities of the Transformation of Austenite in the Martensitic and Intermediary Ranges.** M. G. Lozinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 11, Nov., p. 36-43 + 4 plates.

Apparatus for studying microstructure of metals and alloy during high-temperature heating, with direct microscopic observation. Micrographs, diagram, photograph. 9 ref. (N8 N9, M21)

209-N. **On the Behavior of Rapidly Diffusing Acceptors in Germanium.** F. van der Maesen and J. A. Brenkman. *Electrochemical Society, Journal,* v. 102, May 1955, p. 229-234.

Studies of the acceptor activity of copper and nickel and their diffusion in germanium. Tables, graphs. 12 ref. (N1, P15, Ge)

210-N. **Some Observations on Isothermal Austenite Transformation Near the M_s Temperature.** O. Schaaber. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Apr. 1955, p. 559-560.

Observations made on number of low alloy steels by dilatometric and inductive measurement at various temperatures. Tables, graphs. 12 ref. (N8, ST)

211-N. **Stability of Inorganic Compounds in High Vacuum.** M. Auwärter. *Henry Brutcher Translation No.* 3425, 8 p. (From *Plansee (Austria) Proceedings,* 1952, p. 1-7.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 234-N, 1953. (N12)

212-N. (English.) **On the Order-Disorder Transformation of the Alloys of Iron and Cobalt.** Hakaru Masumoto, Hideo Saito and Masao Shinozaki. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 523-528.

Data on measurement of specific heat of the phase alloys of the iron-cobalt system. Graphs, tables. 5 ref. (N10, Fe, Co)

213-N. (English.) **On the Primary Crystallization of the System Sn-Bi.** Tadashi Yanagihara and Rokuro Kawanishi. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 557-564.

Viscosity change during the solidification of the alloy tin-bismuth was studied with the rotational viscosimeter. Diagrams, graphs, tables, micrographs. 3 ref. (N12, Sn, Bi)

214-N. (Russian.) **Growth of Spheroidal Inclusions of Graphite in Cast Irons.** K. P. Bunin, Iu. N. Taran and T. M. Shpak. *Doklady Akademii Nauk SSSR,* v. 101, no. 1, Mar. 1, 1955, p. 65-67.

Nature of phenomena in gray magnesium cast iron with solidification and tempering. Micrographs. 9 ref. (N12, CI)

215-N. (Russian.) **Solubility of Oxygen in Liquid Iron Which Contains Titanium.** B. K. Liaudis and A. M. Samarin. *Doklady Akademii Nauk SSSR,* v. 101, no. 2, Mar. 11, 1955, p. 325-326.

Two reaction formulas, on the basis of experimental data, are presented; one for titanium concentrations up to 0.04%, and the second for 0.04 to 0.5%. Table. (N12, Fe, Ti)

216-N. **The Strain-Ageing of Pure Iron.** B. Jones and R. A. Owen-Barnett. *Iron and Steel Institute, Journal,* v. 180, May 1955, p. 20-23 + 2 plates.

Aging of pure iron after temper-rolling and tensile-straining. Tables, graphs, micrographs. 6 ref. (N7, Fe)

217-N. **Kinetics of the Martensite Transformation in a Hyper-Eutectoid Steel.** J. Philibert and C. Crussard. *Iron and Steel Institute, Journal,* v. 180, May 1955, p. 39-48 + 1 plate; disc., p. 48-50.

Study of nucleation of martensite and theoretical calculations to account for high rate of nucleation. Graphs, micrographs. 12 ref. (N8, AY)

218-N. (French.) **Ordered Phase of a Copper Alloy Having 2% Beryllium.** Arunachala Viswânathan. *Comptes rendus,* v. 240, no. 13, Mar. 28, 1955, p. 1428-1430.

Copper alloy shows, by quenching from 750° C., the appearance of a tetragonal gamma phase which is transformed into the gamma phase upon tempering. Diagram. 2 ref. (N10, Cu)

219-N. (German.) **Contribution to the Investigation of Recrystallization Processes.** Z. Morlin. *Acta Physica Academiae Scientiarum Hungaricae,* v. 4, no. 3, 1955, p. 197-208.

Microscopic study of recrystallization mechanism and grain boundaries in sodium chloride. Micrographs. 7 ref. (N5)

220-N. (Russian.) **Theory of Diffusion of Atoms in Alloys.** M. A. Krivoglaz and A. A. Smirnov. *Uspekhi Fizicheskikh Nauk,* v. 60, no. 3, Mar. 1955, p. 391-442.

Diffusion effected by vacancy mechanism interstitially in crystal lattice; equations for determining diffusion coefficient in alloys of beta brass, Fe_3Al, etc. Diagrams, graphs. 29 ref. (N1, Cu, Fe, Al)

221-N. (Russian.) **Investigation of the Martensitic Transformation in Steel.** A. N. Alfimov and A. P. Guliaev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 680-686.

Temperature and kinetics of transformation during cooling. Effect of grain size and number of grains in test piece on start of transformation. Graphs, photographs, micrograph. 4 ref. (N8, ST)

222-N. (Russian.) **Diffusion of Tin and Antimony in Semiconductor Compounds of Bi_2Se_3 and Bi_2Te_3.** B. Boltaks. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 767-768.

Measurement of coefficients of diffusion, in various temperature ranges, by radioactive isotopes and the absorption method. Graphs. 4 ref. (N1, Se, Te, Bi)

223-N. **Effect of Plastic Deformation on the Kinetics of Martensite Formation in a High Chromium Steel.** S. C. Das Gupta and S. S. Pani. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 161-169; disc., p. 169-171.

Effect of varying degrees of deformation produced by compression and tension on the austenite-martensite transformation in a 15% chromium-0.7% carbon steel. Graphs. 23 ref. (N8, Q24, AY)

224-N. Mechanism of a New Type of Ageing Phenomenon in Iron and Steel on Anodic Surcharging. K. C. Som and G. P. Chatterjee. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 196-208; disc., p. 208-210.

Various phenomena responsible for changes in hardness. Graphs, tables. 8 ref. (N7, Fe, ST)

225-N. Diffusion in Solid Metals and Alloys. G. P. Chatterjee. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 223-229; disc., p. 229-231.

Development of the concept of diffusion on the basis of potential and energy-density considerations. 10 ref. (N1)

226-N. Diffusion of Zinc in Alpha Brass Containing Tin. K. C. Som, P. K. Sen and G. P. Chatterjee. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 233-238; disc., p. 239-240.

Diffusion was evaluated as function of concentration and temperature. Diffusion coefficient of zinc is increased by the presence of tin. Diagram, tables, graphs. 6 ref. (N1, Cu, Zn, Sn)

227-N. Electrolytic Migration of Carbon in Steel. P. Dayal and L. S. Darken. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 241-250.

Accurate determination of the migration rate under the influence of direct current and the varying conditions of temperature and concentration, the charge borne by the carbon ion in austenite, and the transport number of carbon. Diagrams, table, micrographs. 9 ref. (N1, ST)

228-N. Anisotropic Diffusion Lengths in Diffusion Theory. Bernard I. Spinrad. *Journal of Applied Physics,* v. 26, May 1955, p. 548-550.

A set of formulas defining diffusion lengths in heterogeneous assemblies which, even in the homogeneous limit, lead to anisotropic diffusion lengths for systems such as rod or slab assemblies which are microscopically anisotropic. (N1)

229-N. Nucleation of Ammonium Iodide Crystals From Aqueous Solutions. J. B. Newkirk and D. Turnbull. *Journal of Applied Physics,* v. 26, May 1955, p. 579-583.

Attempts to find a quantitative relationship between the kinetics of nucleation and the atomic disregistry on the unstrained conjugate planes of the catalyst and nucleus. Graph, table, diagrams. 8 ref. (N2)

230-N. Allotropic Transformations in Ternary Metal Systems. A. Prince. *Metal Treatment and Drop Forging,* v. 22, May 1955, p. 198-201.

Transformation equilibria involving the melt. Diagrams. 5 ref. (N6)

231-N. Growth of Monocrystals of Germanium From an Undercooled Melt. E. Billig. *Royal Society, Proceedings,* v. 229, ser. A, May 10, 1955, p. 346-363 + 5 plates.

Technique developed for rapid growth of monocrystals of germanium and other materials with the diamond or zinc blende structure. Tables, diagrams, micrographs, photographs. 14 ref. (N12, Ge)

232-N. (German.) **Radiation Damage and Diffusion Processes in Precious Metals.** A. Seeger. *Zeitschrift für Naturforschung,* v. 10a, no. 3, Mar. 1955, p. 251-253.

Effect of bombardment with deutron particles, plastic deformation and quenching on the lattice structures of copper, silver, gold, and their alloys. Tables. 12 ref. (N1, Cu, Ag, Au)

233-N. (Russian.) **Quantitative Investigation of the Distribution of Elements in Alloys.** S. T. Kishkin, S. Z. Bokshtein, L. M. Moroz and T. I. Gudkova. *Doklady Akademii Nauk SSSR,* v. 101, no. 4, Apr. 1, 1955, p. 667-670.

Distribution of tungsten or of columbium in nickel; relation of micro-nonhomogeneity to rate of crystallization, plastic deformation, heat treatment and alloy composition. Graphs, micrograph. 5 ref. (N12, Ni, Cb, W)

234-N. (Russian.) **Kinetics of the Isothermal Martensite Transformation in the Vicinity of Absolute Zero.** B. Ia. Liubov and Iu. A. Osip'ian. *Doklady Akademii Nauk SSSR,* v. 101, no. 5, Apr. 11, 1955, p. 853-856.

Effect of energy of atomic vibrations on process rate; classical and quantum effects at low temperatures. Table, graph. 7 ref. (N8)

235-N. (Russian.) **Diagram of the Recrystallization of Iodide-Processed Titanium.** E. M. Savitskii, M. A. Tylkina and A. N. Tiranskaia. *Doklady Akademii Nauk SSSR,* v. 101, no. 5, Apr. 11, 1955, p. 857-859 + 1 plate.

Microstructures after cold rolling and tempering at various temperatures; optimum range for obtaining fine-grained recrystallization structure of alpha-modification. Phase diagram, micrographs. (N5, Ti)

236-N. (Russian.) **Intermediate Transformation of Supercooled Austenite.**

L. I. Kogan and R. I. Entin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 67-79.

Redistribution of carbon during transformation of austenite at intermediate temperatures. Micrographs, graphs, tables. 22 ref. (N8, ST, AY)

237-N. The Influence of Lattice Vibrations on the Order-Disorder Transitions of Alloys. C. Booth and J. S. Rowlinson. *Faraday Society, Transactions,* v. 51, Apr. 1955, p. 463-467.

Statistical theory of order-disorder transitions modified to include the energy of the thermal vibrations of the atoms. Graph. 6 ref. (N10)

238-N. Recovery and Recrystallization in Metals Examined in Terms of the Restoration of the Transient Creep Properties. A. J. Kennedy. *Physical Society, Proceedings,* v. 68, no. 425B, May 1955, p. 257-276.

Investigation to determine the dependence of creep recovery on the temperature of the specimen during the recovery period. As recrystallization brings about a new mean grain size, the dependence of recovery on this factor is also examined. Graphs, table, diagrams. 34 ref. (N4, N5, Q3, Pb)

239-N. The Metallographic View. X. Effect of Heat Treatment on Medium Carbon Forgings. Howard E. Boyer. *Steel Processing,* v. 41, May 1955, p. 315-323.

In plain carbon steels, one heat treating operation is frequently sufficient to provide a structure suitable for machining, forming and final heat treatment; in the case of alloy steels, irrespective of carbon content, at least two heating operations are more often required before suitable structures can be obtained. Micrographs. (N8, J general, ST)

240-N. Solid Solutions and Grain Boundaries. B. L. Averbach, M. Cohen, F. Herbstein, J. Hilliard and R. Kaplow. *U. S. Atomic Energy Commission, NYO*-7044, Mar. 1955, 3 p.

Thermodynamic and X-ray techniques combined in a study of fundamental behavior of solid solutions. Solid solutions, adaptable to both of these methods, are being investigated in order that combined data may be useful in providing a more complete picture of atomic configuration in solid solutions. (N12, M25)

241-N. Fundamentals of Cold Working and Recrystallization. B. L. Averbach, M. Cohen, S. Allen, M. F. Comerford and C. Houska. *U. S. Atomic Energy Commission, NYO*-7074, Mar. 31, 1955, 3 p.

Fourier analysis of X-ray diffraction line shapes and metallographic methods used to investigate detailed structure of plastically deformed metals. (N5, Q24)

242-N. Effect of Variations in Hardening and Tempering Temperatures. Edwin Gregory. *Wild-Barfield Heat-Treatment Journal,* v. 5, Mar. 1955, p. 2-4 + 3 plates.

Precipitation of chromium, molybdenum and vanadium carbides in steel and resultant shock and impact properties. Tables. (N7, Q6, J27, AY)

243-N. (English.) **Grain Boundary Diffusion in a Body-Centered Cubic Lattice.** C. W. Haynes and R. Smoluchowski. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 130-134.

Investigation of the possible variation of grain boundary diffusion where the orientation of the crystals formed the boundary. Table, graph, radiograph, diagrams. 20 ref. (N1, Fe)

244-N. (English.) **On the Diffusion of Oxygen Through Solid Iron.** J. L. Meijering. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 157-162.

Study of the existence of intergranular diffusion of oxygen though iron made in an argon atmosphere. Micrographs, graph. 27 ref. (N1, Fe)

245-N. (English.) **Effect of Grain Boundaries Upon Formation and Dimensional Changes During Diffusion.** R. W. Balluffi and L. L. Seigle. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 170-177.

Study of effect of grain-boundary configuration upon structural and shape changes in dezincified brass. Table, graphs, micrographs. 22 ref. (N1, Cu)

246-N. (English.) **The Mechanisms of Self-Diffusion in Tin.** J. F. Nicholas. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 178-181.

Experimental data for self-diffusion in tin analyzed in terms of six possible diffusion mechanisms. Tables, graph, diagram. 8 ref. (N1, Sn)

247-N. (Czech.) **Diffusion Coefficient of Aluminum in Iron for Solid Solution Range.** Pavel Gröbner. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 200-202.

Equation calculated for the diffusion coefficient of aluminum in iron for the temperature range 950

to 1100° C. Diagram, graphs, micrograph, tables. 9 ref. (N1, Fe, Al)

248-N. (Czech.) **Phase Transformations in Copper-Aluminum and Copper-Aluminum-Nickel Alloys and Their Influence on Hardness.** Karel Toman. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 202-209.

Phase relations and the structure of stable and meta-stable phases of the two systems. Graphs, diagrams, micrographs. 5 ref.
(N6, Q29, Cu, Al, Ni)

249-N. (Polish.) **Contemporary Views on the Dispersion Hardening of Metal Alloys.** Fryderyk Staub and Kazimierz Joszt. *Hutnik,* v. 22, no. 2, Feb. 1955, p. 54-62.

Changes of strength properties during aging; statistical thermodynamic and precipitation hardening theories; investigations utilizing irradiation by neutrons and electron microscopy. Graphs, table, diagrams. 28 ref. (N7, Q23)

250-N. (Russian.) **Role of the Surface in the Graphitization of White Cast Iron.** K. P. Bunin, Ia. V. Grechnyi, and N. M. Danil'chenko. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 12-15.

Diffusion of carbon in the austenite from one surface to another; effect of vacuum, hydrogen or inert gases on rate of graphitization; effects of variation of heat treatment and character of surface on rate of diffusion. Micrographs, diagrams. 26 ref. (N8, CI)

251-N. The Effects of Oxygen and Nitrogen in Solid Iron and Steel. L. C. Bogan. *Australasian Engineer,* 1955, Apr., p. 59-65.

Nitrogen activity in alpha and gamma iron aids in understanding phenomena associated with plastic flow; in steels, oxygen provides information on the effects of nonmetallic inclusions. The solid-solution effects of both gases can be effectively suppressed by aluminum, titanium or zirconium, fixing them as compounds which have a low solubility in alpha iron. Micrographs, tables, graphs. 22 ref.
(N12, CI, ST)

252-N. The Topography of Solid-Liquid Interfaces of Metal Crystals Growing From the Melt. C. Elbaum and B. Chalmers. *Canadian Journal of Physics,* v. 33, May 1955, p. 196-208.

Technique developed for separating, during crystal growth, the liquid from the adjacent solid. Diagrams, micrographs. 6 ref. (N12, Pb)

253-N. Atomic Interaction in Molten Alloy Steels. John Chipman. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 97-106.

Interactions between two or more dissolved elements in liquid iron examined through the effect of one on the activity coefficient of the other. Table, graphs. 40 ref.
(N14, P12, ST)

254-N. The Strain Ageing of Alpha-Iron. W. R. Thomas and G. M. Leak. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 155-161.

Rates of strain aging on specimens containing only nitrogen and on those containing only carbon. Table, graphs. 16 ref.
(N7, M26, Q24, Fe)

255-N. Considerations in the Evaluation of Graphitization in Piping Systems. Helmut Thielsch, E. M. Phillips, and E. R. Jerome, Jr. *Welding Journal,* v. 34, June 1955, p. 286S-294S.

Laboratory investigations of graphitized piping, sampling, bend and impact testing, and metallographic grading; interpretation of test results; number of specimens required; effects of heat treatments. Photographs, diagrams, graphs, tables, micrographs. 3 ref. (N8)

256-N. (English.) **An Electro-Acoustical Study on Cold-Working and Recrystallization of Aluminium.** F. Gatto. *Nuovo cimento (Supplemento),* v. 1, ser. 10, no. 2, 1955, p. 124-125.

Measurement of elastic constants can be applied to studying the phenomena connected with cold working and recrystallization of metals. Graphs. (N5, Q24, Al)

257-N. (English.) **Transport Phenomena in Melts and the Mechanism of Melting.** A. R. Ubbelohde. *Nuovo cimento (Supplemento),* v. 1, ser. 10, no. 2, 1955, p. 126-138; disc., p. 138-139.

Transport phenomena, in particular the viscosity of the melts near the freezing point, and some significant facts about the thermodynamic parameters of melting. Graphs, tables. 17 ref. (N14)

258-N. (English.) **Self-Diffusion in Liquid Metals.** G. Careri and A. Paoletti. *Nuovo cimento (Supplemento),* v. 1, ser. 10, no. 2, 1955, p. 161-164; disc., p. 164-165.

Brief report on some measurements of the self-diffusion coefficient on the basis of theories of the liquid state. Tables. (N1, Sn, Pb, In)

259-N. (Russian.) **Study of Diffusion Throughout the Grain and Along Grain Boundaries, Using the Method**

of Autoradiography. S. Z. Bokshtein, S. T. Kishkin, L. M. Moroz and T. I. Gudkova. *Doklady Akademii Nauk SSSR,* v. 102, no. 1, May 1, 1955, p. 73-75 + 1 plate.

Relation of density of darkening to depth of lead diffusion in nickel and iron; comparison of rate of diffusion in crystals and along boundaries; difference in mutual solubility of the metals. X-rays, graphs. 8 ref. (N1, N12, Pb, Fe, Ni)

260-N. (Russian.) **Determination of the Coefficients of Diffusion on the Basis of the β-Radiation Absorption.** A. A. Zhukhovitskii and V. A. Geodakian. *Doklady Akademii Nauk SSSR,* v. 102, no. 2, May 11, 1955, p. 301-304.

Includes graphs. 6 ref. (N1)

261-N. (Russian.) **Methods of Growing Monocrystals of Metals With a Given Spatial Orientation and With Natural Crystallographic Faces.** D. M. Chigvinadze. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 805-811.

Bridgman's and other methods for obtaining monocrystals of zinc and its alloys, including descriptions of apparatuses, heating temperatures, etc. Microstructure of natural crystallographic faces. Diagrams, micrographs. 10 ref. (N12, M27, Zn)

262-N. (Russian.) **Third Transformation During the Tempering of Steel.** V. G. Permiakov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 908-915.

Carbide reactions involved in the third transformation during tempering; heating temperature at which intermediate carbide passes into cementite; dilatometric and magnetometric curves. Diagram, graphs, table. 16 ref. (N8, J29, ST, CN)

263-N. (Russian.) **Linear Rate of Crystallization of Metals.** B. M. Maslennikov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 933-938.

Solution of thermal conductivity problem and the experimental verification of this solution. Tables, graph. 13 ref. (N12, P11, Pb, Sn, Zn)

264-N. (Swedish.) **The Decomposition of Martensite in Iron-Carbon Alloys.** Gunnar Folke and Erik Nygren. *Jernkontorets Annaler,* v. 139, no. 4, 1955, p. 250-264.

Decomposition in high purity iron-carbon alloys ranging from 0.15 to 1.42% carbon and in a carbon steel studied by X-ray diffraction methods. Tables, graphs. 27 ref. (N8, Fe)

265-N. **Effect of Reactor Irradiation on the White-to-Grey Tin Transformation.** Jerome Fleeman and G. J. Dienes. *Journal of Applied Physics,* v. 26, June 1955, p. 652-654.

Effect of low-temperature (liquid nitrogen) reactor irradiation. The transformation, measured by dilatometry, is drastically accelerated. Graph, table. (N6, Sn)

266-N. **Solid State Diffusion in the Reduction of Magnetite.** J. O. Edstrom and G. Bitsianes. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, June 1955, p. 760-765.

Parabolic rate constants are determined for the formation of wüstite by the solid state reaction between magnetite and iron. Reaction was diffusion controlled and inert marker studies indicated that the mass transport through the wüstite layer was accomplished by means of iron migration. Diagram, graphs, micrographs, table. 19 ref.
(N1, D general, Fe)

267-N. **Diffusion in Liquid-Bismuth Alloys.** R. E. Grace and G. Derge. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 839-842.

Diffusivity measured by the capillary reservoir method as a function of temperature and composition. Tables, diagrams, graphs. 13 ref.
(N1, Pb, Bi)

268-N. **Principles and Applications of Step Quenching (Martempering).** Richard F. Harvey. *Metal Treating,* v. 6, May-June 1955, p. 6-8, 10-11.

Structural effects of interrupted quenching; isothermal transformations; mechanical working effects. Diagrams, graphs, table.
(N8, J26, AY)

269-N. **Accelerated Graphitization of White Cast Iron With Increased Chromium Content.** M. A. Krishtal. *Henry Brutcher Translation No.* 3446, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 98, no. 4, 1954, p. 583-584.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 25-N, 1955. (N8, CI)

270-N. **Usefulness of Continuous-Cooling TTT Diagrams for Special Problems With High-Strength Weldable Steels.** F. Nehl and A. Rose. *Henry Brutcher Translation No.* 3476, 22 p. (From *Stahl und Eisen,* v. 74, 1954, p. 1054-1062.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 382-N, 1954.
(N8, K general, Q25, AY)

271-N. Effect of Cyclic Stressing Upon Diffusion in Plain Carbon Steels. H. Schenck and E. Schmidtmann. *Henry Brutcher Translation No.* 3500, 9 p. (Part from *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, 1954, p. 579-583.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 107-N, 1955.
(N1, N7, CN)

272-N. Some Fundamental Considerations Regarding the Transformations of Austenite in the Pearlite and Bainite Ranges. W. Jellinghaus and E. Houdremont. *Henry Brutcher Translation No.* 3510, 23 p. (Abridged from *Stahl und Eisen,* v. 25, nos. 5-6, 1954, p. 263-270.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 321-N, 1954. (N8, AY)

273-N. Diffusion of Arsenic in Steel. D. S. Kazarnovskii. *Henry Brutcher Translation No.* 3518, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 100, no. 6, 1955, p. 1073-1075.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 207-N, 1955.
(N1, M27, ST, As)

274-N. (German.) **Investigation of the Tendency of Soft Unalloyed Steels to Age by Hardness Testing at Temperatures Up to 300° C.** Eduard Houdremont, Wolfgang Wepner and Hans-Joachim Wiester. *Archiv für das Eisenhüttensen,* v. 26, no. 5, May 1955, p. 279-295.

Effect of aging temperature, type of steel, nitrogen and carbon content, insoluble nitrides, hot working, and heat treatment on the susceptibility of steel to age hardening. Diagrams, tables, graphs. 4 ref.
(N7, Q29, CN)

275-N. (German.) **Microscopic Evidence of Carbide From Supersaturated Alpha Irons.** Hugo Josef Seemann and Ursula Hintzpeter. *Archiv fur das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 287-289.

Effect of artificial aging time on the structures and hardnesses of two irons with 0.02 and 0.13% carbon content. Graph, micrographs. 7 ref. (N7, Q29, CN)

276-N. (German.) **Effect of Elastic Stresses on Martensite Formation.** Albert Kochendörfer and Hans-Günter Müller. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 291-298.

Preparation of monocrystals of iron-nickel steel; effect of quenching and elastic tensile and shear stresses on martensite orientation. Diagrams, micrographs, photographs. 21 ref. (N8, AY)

277-N. (German.) **Atomistic Considerations of the Effect of Alloying Elements on the Polymorphism of Iron.** Konrad Schubert. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 299-305; disc., p. 305-306.

Effect of alloying element on the transformation of iron and on the stability of the structures of martensitic iron alloys explained by position of the element in the periodic system and its outer-shell configuration. Table, graphs, diagrams. 36 ref. (N6, Fe)

278-N. (Pamphlet.) **Diffusion of Iron, Nickel and Cobalt Into Hot-Pressed Titanium Carbide.** PB 111612. 32 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00.

Calculation of the diffusion coefficients is made both by the surface decrease method and by the determination of the concentration gradient within the sample.
(N1. Ti, Fe, Ni, Co)

279-N. (Pamphlet.) **Minutes of Titanium Symposium on Diffusion and Mechanical Behavior.** PB 111567. 59 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50.

Papers and discussion on the diffusion of hydrogen, nitrogen, and oxygen, volume diffusion of carbon, the effect of hydrogen on the ultrasonic attenuation in titanium, the effect of temperature on slip and twinning in titanium, plasticity of beta titanium. (N1, Q general, Ti)

280-N. Effect of Cobalt on Diffusion of Carbon. (Digest of "Influence of Cobalt on the Diffusion of Carbon in Iron-Carbon Alloys", by V. A. Yurkov and M. A. Krishtal; *Doklady Akademii Nauk SSSR,* v. 92, 1953, p. 1171-1173.) *Metal Progress,* v. 68, July 1955, p. 148, 150.

Previously abstracted from original. See item 16-N, 1954.
(N1, Fe, Co)

281-N. Progress Report on Loading of Titanium With Deuterium. James W. Ruff. *U. S. Atomic Energy Commission UCRL*-4496, May 1955, 7 p.

A system that permitted loading with deuterium gas of high purity was designed and built. Some of the parameters affecting amounts and purity of the absorbed gas were investigated. Diagrams. 5 ref.
(N15, Ti)

282-N. (English.) **On the Mechanism of Aging in Aluminium-Silver Alloys. III. Variation of the Young's Modulus.** Kayako Tanaka, Hidetaro Abe and Ken-ichi Hirano. *Physical Society of Japan, Journal,* v. 10, no. 6, June 1955, p. 454-458.

Investigation to obtain the isothermal aging and heating curves of the Young's modulus on various age hardening alloys, such as Al-Ag, Al-Cu, Al-Zn, Al-Mg-Zn, as well as some copper-base alloys. Diagram, graphs. 22 ref.
(N7, Q21, Al, Ag, Cu, Zn, Mg)

283-N. (English.) **On Producing Thin Single Crystal Foils of Aluminium Which Have Any Desired Crystallographic Orientations.** Hiroshi Fujiwara and Takao Ichiki. *Physical Society of Japan, Journal,* v. 10, no. 6, June 1955, p. 468-471.

Method of producing aluminum foils (0.06 x 5 x 100 mm.^{3}, 99.53% in purity) having definite crystallographic orientations. Photographs, diagrams. 6 ref.
(N12, M26, Al)

284-N. (French.) **Application of the Theory of Explosive Waves to the Growth of Martensite.** Charles Crussard. *Comptes rendus,* v. 240, no. 24, June 13, 1955, p. 2313-2315.

Calculations showing that a shock and reaction wave may propagate in a solid at a rate of the order of that of sound, and indicates probability that martensite is formed by this mechanism. Diagram. 5 ref. (N8, ST)

285-N. (French.) **Micrographic Study of the Eutectoid Transformation in Nonalloyed Cast Irons.** Michel Ferry and Gabrielle Aubrion. *Fonderie,* 1955, no. 112, May, p. 4497-4512.

Study of different structural changes appearing in cast irons during cooling or continuous heating, temperature variations being of the order of 150° C. per hour. Diagrams, micrographs. 16 ref.
(N8, CI)

286-N. (French.) **Heat Treatment of Cast Steels. I.** *Fonderie,* 1955, no. 112, May, p. 4529-4533.

Heterogeneity of steel produced by its solidification; microscopic structure of steel due to cooling after solidification. Diagrams, micrographs. (To be continued.)
(N12, N8, CI)

287-N. (French.) **Oxidation and Recrystallization of Tin Under a Reduced Pressure.** Jean-Jacques Trillat. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 349-352.

Through the use of a furnace, at controlled temperature, it was possible to follow, continuously, the passage of tin from the crystalline state to the liquid state, then its progressive transformation into the oxides—SnO and SnO_2. Diagram, photographs. 7 ref. (N5, Sn)

288-N. (French.) **The Influence of Elements of Low Solubility on the Properties of Ferrite.** W. P. Rees. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 375-391.

The very large effects which small amounts of carbon, nitrogen and oxygen have on the properties of iron. The influence of these three elements is dependent on the rate at which the alloys are cooled from an elevated temperature. Photographs, micrographs, diagram, graphs, tables. 7 ref. (N8, Fe)

289-N. (French.) **Properties of Iron Carbonitrides.** R. Bridelle and A. Michel. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 397-400.

The carbonitride phases of iron are studied. For each phase conditions of fomration, structural characteristics, Curie Point and thermal evolutionary process are specified. Graphs. 14 ref. (N8, Fe)

290-N. (German.) **Influence of External Stress on the Formation of Martensite.** Werner Schmiedel and Heinrich Lange. *Archiv für das Eisenhüttenwesen,* v. 26, no. 6, June 1955, p. 359-363.

Influence of different stresses and deformation on martensite formation in 18-8 steel; interpretation of results. Graphs. (N8, SS)

291-N. (German.) **Segregation of Copper From Supersaturated Solid Zinc Solution.** W. Gruhl. *Metall,* v. 9, no. 9-10, May 1955, p. 353-357.

Dilatometric, microscopic and X-ray investigations; effect of copper segregation on hardness and electrical resistance. Graphs, micrographs, X-ray picture. 11 ref.
(N12, Q29, P15, Cu, Zn)

292-N. (German.) **Formation of Large Surface Grains in Brass From Evaporation of Zinc.** F. Erdmann-Jesnitzer and F. Günther. *Metall,* v. 9, no. 9-10, May 1955, p. 377-381.

Heat treating experiments; microstructure and X-ray examinations of specimens. Micrographs, graphs, diagrams, X-rays. 14 ref.
(N3, M27, J general, Cu)

293-N. (German.) **Hexagonal Structures in Monocrystals. I. Segregation of Impurities in Metal Crystals Growing in the Melt.** F. Blaha. *Metall,* v. 9, no. 9-10, May 1955, p. 390-394.

Effect of temperature, cooling rate, atmospheric conditions and impurities on the crystallization of zinc and tin. Micrographs, graph. 17 ref. (N12, Zn, Sn)

294-N. (German.) **Hydrogen Porosity in Metals With Special Consideration**

of Aluminum and Its Alloys. C. E. Ransley and D. E. J. Talbot. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 328-337.

Determination of hydrogen content in aluminum and its alloys; diffusion of hydrogen in aluminum, copper and nickel as a function of temperature; solubility of hydrogen in aluminum and its alloys; determination of porosity; mechanism of pore formation. Graphs, tables, diagrams. 8 ref. (N1, N12, Al)

295-N. (German.) **Diffusion of Antimony, Arsenic, and Indium in Solid Germanium.** W. Bösenberg. *Zeitschrift für Naturforschung,* v. 10a, no. 4, Apr. 1955, p. 285-291.

Electrical measurement of concentration of impurities added to the molten germanium or by diffusion of vapor-deposited films into the germanium monocrystals; determination of diffusion coefficients and of effect of antimony, arsenic and indium on semiconducting properties of germanium. Tables, diagram, graphs. 25 ref.
(N1, P15, Ge, As, In, Sb)

296-N. (Polish.) **Problems of the McQuaid-Ehn Test and of Austenite Grain Growth.** St. Orzechowski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 164-178 + 8 plates.

In fine-grain steels, the McQuaid-Ehn grain may vary during treatment, and the tendency of austenite grains to grow may increase under certain hot working conditions or as a result of heat treatment. Conditions favoring the coarsening of grains and heat treatment necessary, to re-establish original fine grain, are determined. Micrographs, tables, graphs. 35 ref. (N3, AY)

297-N. (Russian.) **Effect of Preliminary Overheating of Steel on the Kinetics of Decomposition of Supercooled Austenite.** V. D. Sadovskii. *Doklady Akademii Nauk SSSR,* v. 102, no. 3, May 21, 1955, p. 515-517 + 1 plate.

Dependence of the persistence of this effect on the reheating temperature and rate. Secondary intragrain texture and the transformation of austenite into pearlite-troostite. Micrographs, graphs. 6 ref.
(N8, ST, AY, SS)

298-N. (Russian.) **Investigation of the Diffusion of Iron in Iron-Nickel Alloys.** M. B. Nieman and A. Ia. Shiniaev. *Doklady Akademii Nauk SSSR,* v. 102, no. 5, June 11, 1955, p. 969-972.

Relation of activation energy and diffusion coefficient to alloy composition. Equations. Graphs. 12 ref . (N1, P13, Fe, Ni)

299-N. (Russian.) **Highly Sensitive Thermomagnetic Apparatus for Studying Phase Transformations in Steel.** A. N. Alfimov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 6, June 1955, p. 1105-1110.

Operation of apparatus; amount of ferromagnetic phase required; peculiarities in curves for martensitic transformation. Table, diagrams, photograph, 2 ref. (N8, ST)

300-N. Graphite Formation in Grey Cast Irons and Related Alloys. H. Morrogh. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, June 1955, p. 655-671 + 14 plates.

Formation of flake graphite, effects of sulfur, titanium and magnesium, graphite spherulites in hypoeutectic magnesium-containing irons. Photographs, micrographs, diagrams. 48 ref. (N8, CI)

301-N. The Solid Solubility of Chromium Carbide, Cr_3C_2, in Titanium Carbide. A. Carter. *Institute of Metals, Journal,* v. 83, v. 2, July 1955, p. 481-484.

Accurate determinations of the solid solubility by X-ray diffraction and metallographic techniques over the temperature range 1250 to 1900° C. Diagrams. 10 ref. (N12, C-n)

302-N. Thermodynamics of Carbon Dissolved in Iron Alloys. IV. Solubility of Carbon in Fe-Si-P Melts. E. T. Turkdogan and L. E. Leake. *Iron and Steel Institute, Journal,* v. 180, July 1955, p. 269-271.

Influence of silicon on the solubility of graphite in iron-phosphorus melts within the temperature and composition range encountered in the process of ironmaking. Graphs, table. 3 ref. (N12, Fe, Si, P)

303-N. Specification of Thermally and Mechanically Induced Nonequilibrium States in AuCu by the Resistivity and Magnetoresistivity. Bernard Wiener, Gerhart Groetzinger and Rathuel McCollum. *Journal of Applied Physics,* v. 26, July 1955, p. 857-862.

Investigation of the nonequilibrium states produced by annealing of thermally disordered samples, annealing of samples, disordered by mechanical deformation, at two different temperatures, and subjecting ordered samples to different amounts of mechanical deformation. Graphs, table. 10 ref.
(N10, P15, Au, Cu)

304-N. Study of the Kinetics of Ordering in the Alloy AuCu. G. C. Kuczynski, R. F. Hochman and M. Doyama. *Journal of Applied Physics,* v. 26, July 1955, p. 871-878.

Kinetics of ordering investigated by measuring change of electrical resistivity as a function of time during isothermal ordering, after various disordering heat treatments. Graphs, micrographs, table. 16 ref. (N10, Au, Cu)

305-N. Thermionic Emission Microscopy of Metals. II. Transformations in Plain Carbon Steels. R. D. Heidenreich. *Journal of Applied Physics,* v. 26, July 1955, p. 879-889.

Direct observation of transformations at temperatures above 625° C. demonstrated for both the A_3 and A_1 transformations. Graphs, micrographs. 11 ref. (N8, M21, CN)

306-N. Recovery and Recrystallization of Cold-Worked Beryllium. G. L. Tuer, D. H. Woodard, D. B. Lister and A. R. Kaufmann. Paper from "The Metal Beryllium". American Society for Metals, p. 466-504.

Effect of annealing on mechanical properties and electrical resistivity, metallographic observations on thermally treated specimens, information on the effect of recovery on X-ray line shapes in beryllium. Graphs, tables, diagrams, micrographs, photographs. 26 ref. (N4, N5, Be)

307-N. (English.) **Influence of Grain Boundaries on the Behaviour of Carbon and Nitrogen in Alpha-Iron.** G. Lagerberg and Ake Josefsson. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 236-244.

Internal friction related to diffusion, solubility and precipitation in solid solutions, grain size and boundary concentrations of carbon and nitrogen. Graphs, micrographs. 19 ref. (N1, N7, Q22, Fe)

308-N. (English.) **Self-Diffusion of Lead in Oriented Grain-Boundaries.** B. Okkerse, T. J. Tiedema and W. G. Burgers. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 300-302.

Thorium-B activated, oriented crystal sections of lead showed preferred diffusion by autoradiography. Graphs, diagrams. 12 ref. (N1, Pb)

309-N. (French.) **Influence of the Purity and the Structure of the Metal on the Solubility of Oxygen in Iron.** Raymond Sifferlen. *Comptes rendus,* v. 240, no. 26, June 27, 1955, p. 2526-2528.

Study made on specimens of cold worked, high-purity iron at different annealing times and temperatures. Tables. 5 ref. (N12, J23, Fe)

310-N. (French.) **The Textures of Lamination and of Recrystallization of Extra Soft Sheet Steel.** G. Pomey and C. Crussard. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 401-416; disc., p. 416-417.

Use of an X-ray diffraction chamber for studying the textures of the sheet identifies crystalline orientations developed during hot and cold rolling and subsequent annealing. Photographs, diagrams, tables. 26 ref. (N5)

311-N. (German.) **Diffusion of Radioactive Copper in Commercial Steel.** R. Lindner and F. Karnik. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 297.

Study of the diffusion rate through steel in a hydrogen atmosphere as a function of temperature. Graph. 1 ref. (N1, Cu)

312-N. Relation of Flake Formation in Steel to Hydrogen, Microstructure, and Stress. A. W. Dana, Jr., F. J. Shortsleeve and A. R. Troiano. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Aug. 1955, p. 895-904.

Transformation characteristics of austenite in a particular section play a major role in the occurrence of flakes. Isothermal and continuous cooling studies demonstrated that flake formation is particularly sensitive to nature, distribution and relative proportions of the microconstituents in the cooled sections. Tables, micrographs, graphs. (N7, AY)

313-N. Self-Diffusion of Fe in the Fe-Ni System. (Digest of "Influence of Carbon on the Self-Diffusion of Iron in the Iron-Nickel System", by P. L. Gruzin and E. V. Kuznetsov; *Doklady Akademii Nauk SSSR,* v. 93, 1953, p. 809-812.) *Metal Progress,* v. 68, Aug. 1, 1955, p. 176, 178.

Previously abstracted from original. See item 191-N, 1954. (N1, Fe, Ni)

314-N. Growth of Graphite Nodules. (Digest of "The Form of Nodules of Temper Carbon in Magnesium Cast Irons", by K. P. Bunin and A. V. Chernovol; *Doklady Akademii Nauk SSSR,* v. 95, 1954, p. 785-787.) *Metal Progress,* v. 68, Aug. 1, 1955, p. 180, 182.

Previously abstracted from original. See item 222-N, 1954. (N8, CI)

315-N. Kinetics of the Superconducting Phase Transition. T. E. Faber. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 47-50.

Experiments to determine what governs the field strength at which growth is just able to start and in what direction and how fast it proceeds. Graphs. (N6, P15, Sn)

316-N. (French.) **Successions of Precipitations and the Structural Hardening in Aluminum Copper 4% Alloys.** A. Saulnier. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v 21, no. 6, June 1955, p. 178-182.

Electron-microscopic investigation shows presence of successive precipitations on submicroscopic level during heat treatment and aging. Micrographs, 5 ref. (N7, J27, Al, Cu)

317-N. (Swedish.) **The Effect of Tempering on the Structure and Properties of a Hardened 13% Chromium Steel.** Sakari Heiskanen. *Jernkontorets Annaler,* v. 139, no. 6, 1955, p. 361-411.

Carbide reactions on tempering; investigation of carbides by light and electron microscope and by X-ray diffraction. Low corrosion resistance at certain stage of tempering explained by formation of local cells, principally due to difference in chromium content, between carbide ferrite contact surface and the rest of the ferrite. Graphs, tables, micrographs. 28 ref. (N8, J29, AY)

318-N. (English.) **Grain Growth Observed by Electron Optical Means.** G. W. Rathenau. Paper from "L'état solide". Institut International de Physique Solvay, p. 55-72.

Emission microscopy of changes in metal crystals in films; grain boundary movements; growth accompanying alloy phase transformations. Micrographs, graphs. 12 ref. (N3)

319-N. (English.) **Recrystallization and Grain Growth in Solid Metals.** W. G. Burgers. Paper from "L'état solide". Institut International de Physique Solvay, p. 73-156; disc., p. 157-166.

Structural changes taking place in metals during heat treatment, and their influence on the number, size, shape, state or orientation of the constituent crystallites. Graphs, diagrams, micrographs. 240 ref. (N3, N5)

320-N. (English.) **Recent Work on Solid State Transformations in Sweden.** E. Rudberg. Paper from "L'état solide". Institut International de Physique Solvay, p. 167-187; disc., p. 188-196.

Precipitation and order-disorder changes; isothermal transformation of austenite; embryology of precipitating phases. Graphs, micrographs. 20 ref. (N7, N10, N8)

321-N. (English.) **Diffusion, Work-Hardening, Recovery and Creep.** N. F. Mott. Paper from "L'état solide". Institut International de Physique Solvay, p. 515-534.

Review of theories; sources of dislocation rings; origin of cross slip; Kirkendall effect. Diagrams. 30 ref. (N1, N4, Q3)

322-N. (French.) **Study of Interferences of Thermal Agitation Waves in Crystals: Application to the Activation of Transformations.** C. Crussard. Paper from "L'état solide". Institut International de Physique Solvay, p. 345-369; disc., p. 370-375.

Calculation of the probability of cooperative movements; applications. Graphs. 20 ref. (N general)

323-N. (Book.) **Grain Growth and Recrystallization in Titanium and Its Alloys.** PB 111627. 70 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.75.

Commercial purity sponge titanium and titanium alloys, when cold worked and annealed, exhibit excessive grain coarsening. A max. average grain size is developed when annealing follows a critical amount of plastic deformation. (N3, N5, Ti)

324-N. **The Welding Phenomena Between Solid and Molten Cast Iron.** Tsunemitsu Muraki. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 42-48.

Studies of the interaction between solid steel and molten cast iron. Tables, graphs, diagram, micrographs. (N1, N12, CI, ST)

325-N. **On the Distribution of Impurity in Crystals Grown From Impure Unstirred Melts.** K. F. Hulme. *Physical Society, Proceedings,* v. 68, no. 427B, July 1955, p. 393-399.

Problem of how rapidly a boundary layer of different impurity concentration attains its final form in the case of growth into an infinite unstirred melt is shown to be capable of exact solution for all values of the segregation constant. Diagrams, graph. 4 ref. (N12)

326-N. (English.) **An Approximation Method for Order-Disorder Problems. I-II-III.** J. Hijmans and J. De Boer. *Physica,* v. 21, no. 6, June 1955, p. 471-516.

Each approximation is characterized by the choice of a certain basic

figure and by the distribution of figures of this type in the lattice over their different configurations. A set of independent macrovariables is introduced to facilitate the minimizing procedure. The method is applied to a triangular lattice with a triangle and a rhombus as the basic figure. Tables, diagrams. 22 ref. (N10)

327-N. (French.) **Calculation of the Diffusion Rate of Hydrogen Through a Nickel Plate.** E. Thomas. *Vide,* v. 10, no. 57, May-June 1955, p. 71-77.

C. J. Smithell's formula applied to a 1 mm. plate from 700 to 1500° K. at various pressures. Tables, graphs. 5 ref. (N1, Ni)

328-N. (German.) **Recrystallization Characteristics of an Al-Mn Alloy.** W. Rosenkranz. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 328-334.

Response of alloys containing chromium and manganese to annealing depends strongly on their structure. The effects of a 24-hr. homogenizing anneal at 600° C. on the grain size of an ingot of an aluminum-manganese alloy have been studied. The annealed alloy recrystallizes even during hot-shaping at 550° C. with coarse grain. Micrographs, photographs. 5 ref. (N5, J23, Al, Mn)

329-N. (Czech.) **Graphite Shape in Spheroidal Cast Iron.** Marie Kralova and Jiri Klaban. Slevarenstvi, v. 3, no. 7; *Prace Ceskoslovenského Vyzkumu Slévarenského,* v. 2, no. 20, July 1955, p. 27-30.

Graphite shape, reconstructed by a series of metallographic sections, precipitated in forms not corresponding to a crystallographic form. Description of precipitation of particles in different positions of graphitic grain section is given. Micrographs, diagrams. 11 ref. (N8, N7, CI)

330-N. (French.) **Application of Radioactive Tracers in the Study of Self-diffusion in Volume at the Boundaries of Metal Grains.** Claude Leymonie and Paul Lacombe. *Métaux, Corrosion-Industries,* v. 30, no. 358, June 1955, p. 231-242.

Intergranular diffusion, critical analysis of existing methods of study, description and technique used in radioactive tracer method. Tables, graphs, diagrams. 64 ref. (N1, S19)

331-N. (French.) **Structure and Allotropic Transformation of Cobalt.** Hervé Bibring and Francois Sebilleau. *Revue de métallurgie,* v. 52, no. 7, July 1955, p. 569-578; disc., p. 578.

Recrystallization of a cold worked cobalt specimen occurs at a lower temperature and in different ways than that of the allotropic transformation; mechanism of transformation to cubic phase can be defined. Graphs, diagram, photograph, micrographs. 4 ref. (N6, N5, Co)

332-N. (German.) **The Solution of Carbon in Molten Iron.** Olaf Dahlke and Ottmar Knacke. *Archiv für das Eisenhüttenwesen,* v. 26, no. 7, July 1955, p. 373-378.

Effect of temperature, type of crucible and bath agitation on the rate of solubility. Micrographs, photographs, diagrams, graphs. 7 ref. (N12, Fe)

333-N. (German.) **Investigation of Quench Aging of Soft Unalloyed Steels With Radioactive Isotopes, Especially Carbon-14.** Hans-Kurt Görlich, Hans Goossens, and Hermann Schenck. *Archiv für das Eisenhüttenwesen,* v. 26, no. 7, July 1955, p. 389-391.

New method of studying processes of quench aging; discussion of possible errors; comparison of photomicrographs with radiation pictures. Tables, micrographs. 7 ref. (N7, J27 M23, CN)

334-N. (German.) **Experiments on the Relationship of Technological Properties and Transformation Structures of Steel Wires.** Hans Schlacher, Jr. *Berg und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, no. 5, May 1955, p. 166-170.

Effect of two special methods of heat treating on the mechanical properties and structures of steel wires. Graphs, micrographs, tables. 6 ref. (N8, J general, Q general, M general, ST)

335-N. (German.) **The Hardness of Rolled Fine Zinc With Low Magnesium Contents.** K. Claus and K. Löhberg. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 670-673.

Effect of magnesium content, degree of rolling, aging temperature and solution heat treatment on the age-hardening of zinc. Graphs. 3 ref. (N7, F23, Zn)

336-N. (German.) **The Absorption of Hydrogen by Lead and Lead Alloys With Magnesium and Calcium.** W. Mannchen and M. Baumann. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 686-688.

Solubility of hydrogen in lead is increased by presence of alloying constituents. Diagram, graphs, tables. 2 ref. (N12, Pb)

337-N. (German.) **Solubility of Copper, Nickel, and Cobalt in Molten Lead.** E. Pelzel. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 692-694.

Formation of equilibrium in supersaturated lead-copper, lead-nickel and lead-cobalt alloys at different temperatures, analytical determination of the concentration of the quenched saturated alloy, computation of entropy of fusion from the resulting solubility curves. Micrographs, tables, graphs. 10 ref. (N12, P12, Pb)

338-N. (German.) **Grain Refining of Aluminum.** Wolfgang Thury. *Zeitschrift für Metallkunde,* v. 46, no. 7, July 1955, p. 488-490.

Nucleation, influence of titanium carbide, aluminum diboride and titanium diboride on pure aluminum and its alloys. Tables. 7 ref. (N2, Al)

339-N. (German.) **Sharp and Diffused X-Ray Interference in the Case of Age Hardening.** Heinz Jagodzinski. *Zeitschrift für Metallkunde,* v. 46, no. 7, July 1955, p. 491-499.

Computation of diffused interference by integration into particle dispersion and interaction terms. Discussion of other computation methods. Diagrams. 14 ref. (N7)

340-N. (German.) **Behavior and Diffusion of Sulfur in Nickel.** Irmtraud Pfeiffer. *Zeitschrift für Metallkunde,* v. 46, no. 7, July 1955, p. 516-520.

Sulfur content and brittleness of nickel; determination of diffusion coefficient of sulfur at 1000, 1100 and 1200° C. and the activation energy of the process. Tables, graphs, micrographs. 8 ref. (N1, Q23, Ni, S)

341-N. (Russian.) **Investigation of Iron Diffusion in Iron-Molybdenum Alloys.** M. B. Neiman and A. Ia. Shiniaev. *Doklady Akademii Nauk SSSR,* v. 103, no. 1, July 1, 1955, p. 101-104.

Coefficient of iron diffusion, determined at 1106, 1148 and 1183° C., decreases sharply with increase of molybdenum content in an alloy, reaching a minimum corresponding to the chemical compound Fe_3Mo_2. Graphs. 5 ref. (N1, Fe, Mo)

342-N. **A Method of Examining Structural Changes of Metals on Deformation in Liquid Helium: Examination of Indium.** W. B. Pearson. *Canadian Journal of Physics,* v. 33, Aug. 1955, p. 473-475.

Debye-Scherrer type of X-ray camera described in which a soft metal can be deformed by extension and photographed *in situ* in liquid helium. Diagrams, 2 ref. (N general, Q24, M23, In)

343-N. **Some Observations on Constitutional Changes in Copper-Aluminium Alloys at Temperatures Below That of the Beta $\rightleftharpoons$ Alpha + Gamma$_2$ Eutectoid.** D. R. F. West and D. Lloyd Thomas. *Institute of Metals, Journal,* v. 83, Aug. 1955, p. 505-507.

Evidence indicates an additional phase forms by prolonged annealing of alloys containing 8.7 to 16.5% aluminum at temperatures in the range 340 to 400° C. Phase diagram. 7 ref. (N6, M24, Al, Cu)

344-N. **Tracer Diffusion of Iron in Stainless Steel.** V. Linnenbom, M. Tetenbaum and C. Cheek. *Journal of Applied Physics,* v. 26, Aug. 1955, p. 932-936.

Measurements over a wide temperature range by the surface activity decrease method, using radioactive iron-55. Equation for lattice diffusion coefficients. Tables, graph. 17 ref. (N1, M26, Fe, SS)

345-N. **Sputtering of Metal Single Crystals by Ion Bombardment.** Gottfried K. Wehner. *Journal of Applied Physics,* v. 26, Aug. 1955, p. 1056-1057.

Mercury sputtering of tungsten and silver single crystals. Structure of deposits. Photographs, micrographs. 2 ref. (N15, L25, Ag, Hg, W)

346-N. **Magnetic Transformation in MnBi.** R. R. Heikes. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 446-447.

Manganese-bismuth loses its spontaneous magnetization very sharply at 663° K. At the same temperature, drastic changes occur in the lattice constants. Graphs, table, 3 ref. (N11, P16, Mn, Bi)

347-N. **Effect of Pretreatment of Martensite on Subsequent Graphitization at 1200° F.** G. V. Smith, E. J. Dulis and B. W. Royle. *Welding Journal,* v. 34, Aug. 1955, p. 374S-378S.

Results of investigations suggesting a possible relation between the high susceptibility of martensite to graphitization and the transition from epsilon carbide to cementite. Micrographs, graph. 8 ref. (N8, CN)

348-N. **New Data on Transformation of Pearlite Into Austenite, in**

Plain Carbon Steel During Electric Heating. Yu. A. Kocherzhinskii. *Henry Brutcher Translation No.* 3541, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 100, no. 6, 1955, p. 1077-78.) Henry Brutcher, Altadena, Calif.

Comparison of dilatometric and thermal analysis curves for coarse pearlite heated at rates of up to 200° C. (360° F.) per sec. Graphs. 4 ref. (N8, CN)

349-N. Solubility of Oxygen in Liquid Iron Containing Titanium. B. K. Lyaudis and A. M. Samarin. *Henry Brutcher Translation No.* 3545, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 101, no. 2, 1955, p. 325-326.) Henry Brutcher, Altadena, Calif.

Numerical data on solubility of oxygen in liquid iron and titanium at 1600° C. (2910° F.) and 1650° C. (3000° F.) Predominant reaction in the deoxidation of liquid iron with titanium, if up to 0.04% titanium is present in the melt. Table. (N12, Fe)

350-N. Recrystallization Diagram for Iodide Titanium. E. M. Savitskii, M. A. Tylkina and A. N. Turanskaya. *Henry Brutcher Translation No.* 3556, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 101, no. 5, 1955, p. 857-859.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 235-N, 1955. (N5, Ti)

351-N. Investigation of Interdiffusion of Titanium and Columbium Borides. G. V. Samsonov and V. S. Neshpor. *Henry Brutcher Translation No.* 3557, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 101, no. 5, 1955, p. 899-900.) Henry Brutcher, Altadena, Calif.

X-ray study of mutual diffusion of TiB_2 and CbB_2 in 50-50 mol % mixture at 1400, 1600 and 1800° C. for periods of ½ to 32 hr. Graph. 6 ref. (N1, SG-j)

352-N. (English.) **Hydrogen Occlusion and Equilibrium Hydrogen Pressure in Steel During Electrolytic Charging.** F. de Kazinczy. *Jernkontorets Annaler,* v. 139, no. 7, 1955, p. 466-480.

Relation between hydrogen flow through steel and current density, equilibrium pressure of hydrogen in steel. Formation of blisters in steel determined by equilibrium hydrogen pressure. Tables, graphs. 17 ref. (N1, H, ST)

353-N. (Czech.) **Two Types of Pearlitic and Ferritic Reactions in Alloy Steels.** Josef Cadek. *Hutnické Listy,* v. 10, no. 7, July 1955, p. 409-414.

Experiments to determine low-temperature pearlitic reaction. Graphs. 6 ref. (N8, AY)

354-N. (German.) **Diffusion of Silver in Selenium.** Gerhard Kienel. *Annalen der Physik,* v. 16, nos. 1-2, 1955, p. 1-6.

Determination at 20° C. of tarnishing constants of binary films of various thicknesses. Diagrams, micrographs, table. 6 ref. (N1, Ag, Se)

355-N. (German.) **Electron-Diffraction Investigations of Diffusion Phenomena in Thin Silver-Selenium Films.** U. Zorll. *Annalen der Physik,* v. 16, nos. 1-2, 1955, p. 7-26.

Electron-diffraction studies of thin selenium films vapor-deposited on a relatively thick layer of silver reveals Ag_2Se compound with "pseudo-cubic" lattice structure of low symmetry which changes, above 130° C., into the strictly cubic body-centered lattice of the high-temperature Ag_2Se modification. Photographs, diagrams, graphs, tables, micrographs. 16 ref. (N1, Ag, Se)

356-N. (German.) **Magnetic Determination of the Form of Coherence Ranges in the Precipitation of Supersaturated Copper-Iron Solid Solutions.** A. Knappwost. *Zeitschrift für physikalische Chemie (Frankfurt),* v. 4, nos. 5-6, July 1955, p. 364-375.

Preparation and heat treatment of copper-iron monocrystals; mathematics of quasi-paramagnetic susceptibility and demagnetization factor; effect of orientation on the quasi-paramagnetic susceptibility; demagnetization factor of the cumuli. Graphs, diagrams. 22 ref. (N7, P16, Cu, Fe)

357-N. Investigations of Diffusion and Atomic Interaction in Alloys With the Aid of Radioactive Isotopes. G. V. Kurdiumov. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/702, June 1955, 13 p. (Translated from the Russian.)

Determination of atoms in solid solutions and influence of alloying elements on properties of alloys by diffusion studies. Graphs. 40 ref. (N1)

358-N. The Solid State Reaction Between Uranium and Aluminium. R. Kiessling. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/786, July 1955, 13 p.

Studies made because of interest in aluminum as a canning material for uranium rods in a reactor. In-

termediary phases discussed. Tables, micrographs, graph. 4 ref. (N general, U, Al)

359-N. Kinetics of the Phase Transition in Superconductors. T. E. Faber and A. B. Pippard. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 159-183.

A model of the superconducting state, nucleation, propagation, elimination of trapped flux. Graphs, diagrams. 25 ref. (N6, N2, P15)

360-N. (English.) **Isothermal Decomposition Kinetics of Transformed-Beta Phase in a Titanium-Nickel Alloy.** D. H. Polonis and J. Gordon Parr. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 307-311.

Proposes a model for the tempering kinetics of transformed beta phase in a 7.2% nickel alloy, based on growth of plates of Ti_2Ni during isothermal heat treatments between 450 and 550° C. Micrographs, graphs, diagram, table. 13 ref. (N6, N7, Ni, Ti)

361-N. (English.) **On the Interpretation of "Low-Temperature" Recovery Phenomena in Cold-Worked Metals.** A. S. Nowick. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 312-321.

Survey of the phenomena carried out to determine to what extent effects due to point defects and dislocations may be separated from one another. Recovery is interpreted as a super position of elementary first-order processes, each having a unique recovery time. Tables, graphs. 56 ref. (N4, M26, J23)

362-N. (English.) **A Growth Mechanism for Mercury Whiskers.** G. W. Sears. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 361-366.

Very fine whiskers of solid mercury, grown by condensation of the vapor on a glass surface, have a single imperfection, an axial screw dislocation, which accounts for their morphology. Diagrams. 17 ref. (N16, M26, Hg)

363-N. (English.) **A Mechanism of Whisker Growth.** G. W. Sears. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 367-369.

Growth of fine whiskers of zinc, cadmium, silver and cadmium sulfide on pyrex and quartz glass substrates by vapor deposition. Table, diagram. 7 ref. (N16, M26, Ag, Cd, Zn)

364-N. (English.) **Stored Energy and Recrystallization.** H. L. Walker and D. L. Bhattacharya. *Indian Institute of Science, Journal,* v. 37, sec. B, July 1955, p. 179-185.

Parabolic relation between stored energy and magnitude of the deformation is suggested and a formula relating recrystallized grain size with deformation is derived which agrees with the empirical rule formulated by Walker. Graph. 5 ref. (N5, P12, Q24)

365-N. (French.) **Relation Between Structures and Properties During Age Hardening in Al-Ag Alloys.** B. Belbeoch and A. Guinier. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 370-379.

Variations of hardness during age hardening correlated with structure variations studied with small-angle X-ray scattering. Photographs, tables, graphs. 10 ref. (N7, J27, Al, Ag)

366-N. (French.) **Magnetic Transformation of Cerium at High Temperatures. Role of Magnesium Impurity.** Francoise Gaume-Mahn. *Comptes rendus,* v. 241, no. 3, July 18, 1955, p. 286-288.

Dependence of magnetic properties on allotropic modification taking place at about 687° C. Influence of magnesium content on the temperature of allotropic modification and magnetic properties. Graphs. 10 ref. (N6, N11, P16, Ce)

367-N. (German.) **Diffusion in Solid Metals.** W. Seith. *Umschau in Wissenschaft und Technik,* v. 55, no. 16, Aug. 15, 1955, p. 491-493.

Mechanism of intermetallic diffusion, effect of temperature and lattice defects, formation of intermetallic phases, importance of diffusion in age hardening, homogenizing treatments and pressure welding. Graph, diagram, tables, micrographs. (N1, N7, J1, K5)

368-N. (Russian.) **Kinetics of the Isothermal Formation of Austenite.** A. P. Guliaev and V. M. Zalkin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 6, June, p. 114-118.

Transformation of pearlite into austenite, effect of rate of heating on the kinetics of formation. Graphs. 8 ref. (N8, CN)

369-N. (Russian.) **Determination of Austenite Content According to Magnetic Saturation.** A. A. Popov and R. Sh. Shkliar. *Zavodskaia Laboratoriia,* v. 21, no. 6, June 1955, p. 677-685.

Magnetic methods of investigating decomposition of supercooled

austenite, technique of operation, description of installation. Graphs, diagrams. 5 ref. (N8)

370-N. (Russian.) **Determination of Coefficients of Diffusion of the Elements in Ferrite, Using Radioactive Isotopes.** V. M. Golikov and V. T. Borisov. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 824-827.

Equations based on the absorption of beta radiation by the specimen. Graph, diagram. (N1, ST)

371-N. (Russian.) **Use of Micro-Autoradiography for the Study of the Redistribution of Chromium During Diffusion Annealing.** I. E. Bolotov and M. I. Gol'dshtein. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 828-830.

Effect of temperature and time of "soaking" during diffusion annealing for the redistribution of the chromium in steels and the degree of homogeneity afterwards. Micrographs, table. (N1, J23, ST, Cr)

372-N. Ordering and Magnetic Heat Treatment of the 50 Pct Fe-50 Pct Co Alloy. R. C. Hall, G. P. Conard and J. F. Libsch. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 985-988.

Marked increase in ratio of residual to saturation induction can be explained on basis of decrease in 90° domain boundaries and by increase in anisotropy resulting from lattice distortion. Graphs. 42 ref. (N10, J21, Fe, Co)

373-N. Diffusion of Co^{60} and Fe^{55} in Cobalt. H. W. Mead and C. E. Birchenall. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 994-995.

Results for given temperature differ by a factor of six with no close agreement between any two sets of data. Table, graph. 8 ref. (N1, Co, Fe)

374-N. Grain Boundary Diffusion of Nickel Into Copper. S. Yukawa and M. J. Sinnott. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 996-1002.

Function of grain boundary angle and diffusion temperature. Activation energy for diffusion decreases with increasing angle. Micrographs, tables, graphs. 9 ref. (N1, Ni, Cu)

375-N. Bainite Reaction in a Plain Carbon Steel. H. I. Aaronson and C. Wells. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1002-1003.

Detailed metallographic investigation of the reaction in a hypoeutectoid steel. Micrographs. 10 ref. (N8, CN)

376-N. Diffusion of Zinc and Copper in Alpha and Beta Brasses. R. Resnick and R. W. Balluffi. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955. p. 1004-1010.

Determination of chemical diffusivity as function of composition and temperature. Graphs, tables, photographs, micrographs. 22 ref. (N1, Zn, Cu)

377-N. Contribution to Mathematics of Zone Melting. Leslie Burris, Jr., C. H. Stockman and I. G. Dillon. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1017-1023.

Equations predict concentration profiles after successive passes and give limiting distribution of solute along bar after an infinite number of passes. Diagram, graphs, table. 6 ref. (N12, C5)

378-N. Instability of a Smooth Solid-Liquid Interface During Solidification. D. Walton, W. A. Tiller, J. W. Rutter and W. C. Winegard. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1023-1026.

Cellular substructure observed in binary alloy crystals grown from melt of known concentration can be eliminated by proper choice of growth conditions. Graphs, micrographs, table. 9 ref. (N12)

379-N. Microcalorimetric Investigation of Recrystallization of Copper. Paul Gordon. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1043-1052.

Study of isothermal annealing of high-purity copper after room temperature tensile deformation. Diagrams, photograph, graphs, micrograph, tables. 19 ref. (N5, P12, Q24, J23, Cu)

380-N. Relationship Between Recovery and Recrystallization in Superpurity Aluminum. E. C. W. Perryman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1053-1064.

Recrystallization results agree with Aurami's theory and indicate

that perfect subgrains formed during recovery are not nuclei for recrystallization. Graphs, tables, micrographs. 30 ref. (N4, N5, Al)

381-N. Grain Boundaries, Substructures and Impurities. R. W. Cahn. Paper from "Impurities and Imperfections". American Society for Metals, p. 41-83.

Concentrates on interactions of impurities and boundaries as well as subboundaries. Diagrams, micrographs, graphs. 121 ref. (N1)

382-N. Effects of Impurities and Imperfections on Crystal Growth. Bruce Chalmers. Paper from "Impurities and Imperfections". American Society for Metals, p. 84-106.

Considers growth in absence and in presence of impurities, and growth from vapors and melt. Diagrams, micrographs, graphs. 24 ref. (N12, N15)

383-N. Role of Structural Impurities in Phase Transformations. David Turnbull. Paper from "Impurities and Imperfections". American Society for Metals, p. 121-144.

Reviews theory and interprets experience on various transformations. Diagrams, table, graph. 52 ref. (N general)

384-N. (English.) **Abnormal Grain Growth of Some Aluminum Alloys.** Thomas L. Fritzlen. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 237-245; disc., p. 245-246.

Results of an investigation to determine the growth characteristics of 99.5% aluminum sheet with small and large deformations at several annealing temperatures and times. Photographs, micrographs. 13 ref. (N3, Al)

385-N. (English.) **On the Theory of the Kirkendall Effect.** Frederick Seitz. Paper from "International Conference of Theoretical Physics, Proceedings". Organizing Committee, International Conference of Theoretical Physics, Science Council of Japan, p. 588-589; disc., p. 590-591.

Survey of evidence concerning the superconcentrations of vacancies that actually are achieved in metals. (N1)

386-N. (French.) **Role of Grain Boundaries and the $\alpha \rightarrow \gamma$ Allotropic Transformation of Iron in the Elimination of Pores During Sintering of Carbonyl Iron.** Georges Cizeron and Paul Lacombe. *Comptes rendus*, v. 241, no. 4, July 25, 1955, p. 409-411.

Investigation based on the hypothesis of self-diffusion mechanisms in volume and at the grain boundaries. Graph. 2 ref. (N1, N6, H15, Fe)

387-N. (French.) **Contribution to the Study of a Property of the Polygonized State of Iron.** Jean Montuelle. *Comptes rendus*, v. 241, no. 4, July 25, 1955, p. 411-412.

Study of recrystallization of polycrystalline and polygonized specimens of irons, of different purities, subjected to slight cold working. Micrograph. 1 ref. (N5, Fe)

388-N. (French.) **Evidence of the Polygonization of Aluminum by X-Rays and Micrography.** Christian de Beaulieu. *Comptes rendus*, v. 241, no. 4, July 25, 1955, p. 412-413.

Results of research and interpretation of Laue spots after high-temperature annealings. 4 ref. (N5, Al)

389-N. (French.) **Textural Phenomena Occurring During the Precipitation of Homogenized Aluminum-Zinc-Magnesium Alloys.** Paul Brenner and Margarete Schippers. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 219-228; disc., p. 228-229.

Preparation of specimens by continuous casting to study the micrographic structure after decomposition of the solid solution. Micrographs, graph. 11 ref. (N7, Al, Mg, Zn)

390-N. (French.) **Example of a Technical Application of the Critical Recrystallization of Aluminum.** H. Buckle. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 257-261.

Methods of treatment to produce the proper coarse grain in aluminum sheet used for decorative effects. Diagram, graph, micrographs. (N5, Al)

391-N. (French.) **Application of the Grain Coarsening Phenomena to the Making of Sheet With Decorative Designs.** Guy Salmon. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 263-269 + 1 plate; disc., p. 269.

Process for obtaining coarse grain of decorative effect with "under-refined" aluminum. Micrographs, photographs. 6 ref. (N3, Al)

392-N. (Hungarian.) **The Crystallization of Graphite in Cast Iron. I.**

Istvan Karsay. *Ontöde,* v. 6, no. 8, Aug. 1955, p. 169-176.

Proposes new hypothesis for interpretation of all aspects of the crystallization process. Diagram, micrographs. (To be continued.) (N12, CI)

393-N. (Polish.) **Diffusion of Arsenic in Rail Steel.** Leonid Andrejew. *Wiadomosci hutnicze,* v. 11, no. 5, May 1955, p. 144-146.

Chemical composition of various melts; microstructure of steel in relation to arsenic content and after heat treatments. Tables, micrographs. 4 ref. (N1, M27, ST)

394-N. (Russian.) **Structural Diagram for Cast Iron Poured Over Into Metallic Molds.** N. P. Dubinin. *Liteinoe proizvodstvo,* 1955, no. 8, Aug., p. 15-16.

Rate of solidification of casting with and without stand core; structure of iron castings cooled with the mold; rate of solidification at different distances from the surfaces of the casting; effect of carbon, silicon or manganese contents on cooling and solidification. Graphs, diagrams. 7 ref. (N12, CI)

395-N. (Russian.) **Mechanism of the Effect of Quenching on Graphitization.** K. P. Bunin and E. N. Pogrebnoi. *Liteinoe proizvodstvo,* 1955, no. 8, Aug., p. 25-27.

Microstructure of steel after various periods of graphitization with and without preceding quenching in water; effect of length of previous austenitization of quenched steel on the number of graphite inclusions formed in the following tempering period. Micrographs, graph. 22 ref. (N8, ST)

396-N. (Russian.) **Influence of the Composition of Bearing Steels on the Carbide Network.** N. K. Ipatov, I. Ia. Aizenshtok and L. D. Kossovskii. *Stal',* v. 15, no. 8, Aug. 1955, p. 739-742.

Effect of variations in the carbon, chromium and manganese contents on the intergranular precipitation of carbide in tempered roll steel. Rate of cooling, tempering techniques and other heat treatment are not sufficient to eliminate or prevent sheating of the micrograin by carbides. Graphs. (N8, ST)

397-N. (Russian.) **Use of Radioactive Inductors to Measure the Diffusion Rate in Solid Bodies.** A. A. Zhukhovitskii. *Uspekhi khimii,* v. 24, no. 5, 1955, p. 575-583.

Importance in obtaining alloys with certain characteristics. Rate of recrystallization, phase transformations and other properties determined by diffusion. Table. 15 ref. (N1)

398-N. (Slovenian.) **The Diffusion Phenomena of Copper in Iron.** Matija Zumer and Franc Sirca. *Rudarsko-metalurski zbornik,* 1955, no. 1, p. 25-33.

Qualitative aspect of the diffusion of electrolytic copper in gamma and alpha iron at 1150, 1089 (epsilon phase), 1050 (both in solid state) and 750° C. (modification of alpha iron); difference between speed of intergranular and volume diffusion; frontal diffusion at temperatures above 1100° C.; effect of impurities. Micrographs, graphs, diagrams, photograph. 16 ref. (N1, Cu, Fe)

399-N. **Austenitic Fe-Cr-C-N Stainless Steels.** G. G. Tisinai, J. K. Stanley and C. H. Samans. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 7, 1955, 14 p.

Completely austenitic structures, without ferrite, carbides and nitrides, can be obtained in 21 to 33% chromium alloys by a proper combination of carbon and nitrogen. The austenite, produced by heating above 2000° F. and retained by rapid cooling, decomposes to ferrite, carbides and nitrides, below the stated austenitizing temperature. The martensite transformation is suppressed but can be obtained in alloys in certain ranges of composition. Tables, micrographs. 12 ref. (N8, M27, Q general, SS)

400-N. **Inhibition by Nitrogen of Graphitization in Steel.** G. V. Smith and B. W. Royle. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 17, 1955, 7 p.

Graphitization, during an arbitrary heat treatment known to promote it, was inhibited in eight heats of cold rolled, high carbon steel strip, by prior heating in an atmosphere of nitrogen for 6 hr. at 1900° F., which increased the nitrogen content from a level of about 0.005 to about 0.013%. Heating in hydrogen for 2 hr. at 1900° F., on the other hand, reduced the nitrogen content to about 0.003% and increased graphitization. Tables, micrographs. 4 ref. (N8, CN)

401-N. **On Banding in Steel.** C. F. Jatczak, D. J. Girardi and E. S. Rowland. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 20, 1955, 33 p.

Banding phenomenon studied in 1340, 2340, 4140, 4340, and 5140 type steels. Banding characteristics of

these steels established by studying transformation behavior to ferrite and pearlite and to martensite on direct quenching and after a prior isothermal treatment at the upper nose of the TTT-curve. Tables, graphs, micrographs. 11 ref. (N8, M27, AY)

402-N. Nature and Decomposition Kinetics of Alpha Prime in Titanium-Vanadium Alloys. F. R. Brotzen, E. L. Harmon and A. R. Troiano. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 24, 1955, 11 p.

Nature and decomposition kinetics of martensitically transformed alpha titanium studied, utilizing X-ray diffraction techniques and electrical resistance and hardness measurements. Graphs. 5 ref. (N9, Ti)

403-N. Some Effects of Metal Removal and Heat Treatment on the Surfaces of Hardened Steels. Karl E. Beu and Donald P. Koistinen. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 28, 1955, 20 p.

Some effects of metal removal and heat treatment on surfaces of hardened steel, using retained austenite and residual stress measurements as a criterion. Graphs. 19 ref. (N8, L10, J general, ST)

404-N. Metallography of Tempering of Alpha-Prime in Titanium Alloys. R. F. Domagala and W. Rostoker. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 25, 1955, 11 p.

Program designed to discover, microscopically, how the alpha phase, a metastable supersaturated isomorph of the alpha phase changes on reheating to that of equilibrium alpha as dictated by the phase diagram. Micrographs. (N6, Ti)

405-N. The Rate of Diffusion of Carbon in Alpha and Beta Titanium. F. C. Wagner, E. J. Bucur and M. A. Steinberg. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 32, 1955, 24 p.

Diffusion rates of carbon in titanium determined over a range of temperature from 736 to 1150° C., excluding the two-phase region occurring between 822 to 920° C. Tables, diagrams, graphs, photograph, micrographs. 10 ref. (N1, Ti)

406-N. Self-Diffusion in Lead. Norman H. Nachtrieb and George S. Handler. *Journal of Chemical Physics,* v. 23, Sept. 1955, p. 1569-1570.

Measured over range of 174 to 322° C. by means of metallic radium deuteride. Table, graphs. 7 ref. (N1, Pb)

407-N (French.) **Apparatus for the Quantitative Determination of Preferential Orientation in Polycristalline Materials.** M. Poganelli and G. Bedeschi. *Alluminio,* v. 24, no. 4, July-Aug. 1955, p. 329-334.

Prepared specimens may be examined by reflection with an X-ray spectrograph. An integrating device makes possible the observation of specimens taken from recrystallized materials or those that underwent a limited deformation. Photographs, diagrams, graphs, micrograph. 10 ref. (N5)

408-N. (German.) **Multi-Crystal Macrohardness of the Quenching Structure of Unalloyed Steel, and the Single Crystal Microhardness of Martensite.** Roland Mitsche and Karl L. Maurer. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 563-565.

Measurement of ten steels, with a carbon content ranging from 0.65 to 1.31%, after different thermal treatments. Tables, graphs. 5 ref. (N8, Q28, ST)

409-N. (German.) **The Effect of Boron and Aluminum Additions on the Graphite Formation of White-Heart Malleable Iron Castings.** Ulrich Klein and Karl Roesch. *Giesserei,* v. 42, no. 19, Sept. 15, 1955, p. 507-515.

Discussion of investigation and results shown in existing literature. Graphs, tables, diagram, micrographs. 9 ref. (N8, CI)

410-N. (German.) **Production of Germanium Single Crystals for Diodes and Transistors.** E. Schöne. *Nachrichtentechnik,* v. 5, no. 8, Aug. 1955, p. 373-374.

Methods for germanium purification and production of material for diodes and transistors. Photographs, micrographs, graphs. (N12, M26, Ge)

411-N. (Russian.) **Theory of Phase Transformations in Steel During Heating.** A. P. Guliaev and V. M. Zalkin. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 7, July, p. 93-95.

Transformation kinetics of pearlite into austenite with continuous heating, effect of rate of heating. Graphs. 3 ref. (N8, ST)

412-N. (Book.) **Nucleation-and-Growth Processes in Metals and Alloys.** H. K. Hardy and T. J. Heal. 46 p. 1955. Institute of Metals, 4 Grosvenor Gardens, London, England.

Examples of thermodynamic and composition relationships show that initial reaction may always be treated as part of precipitation process. (N2, N3, Pt, Co, Cu, Al)

413-N. Theoretical Aspects of Radiation Damage in Metals. G. J. Dienes. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/750, June 1955, 17 p.

Concerned with displacement of atoms from their normal lattice sites by high energy particle bombardment. Table, graph. 46 ref. (M26)

414-N. Measurements of Diffusion Length in Indium Antimonide. D. G. Avery and D. P. Jenkins. *Journal of Electronics,* v. 1, ser. 1, Sept. 1955, p. 145-151.

Determination of injected carrier lifetimes in polycrystalline and single crystal samples from measurements of the carrier diffusion length. Graphs, table. 10 ref. (N1, In, Sb)

415-N. (French.) **Migration Phenomenon of the Lead-Zinc Eutectic in Cast Zinc.** W. Vinaver and P. Dreulle. *Revue de métallurgie,* v. 52, no. 8, Aug. 1955, p. 612-619; disc., p. 620.

Chemical polishing with chromium reagents causes etched figure lines to appear, corresponding to the intergrain and interdendritic boundaries of solidification. Micrographs, graphs. 4 ref. (N12, Pb, Zn)

416-N. (German.) **Measures for the Prevention of Coarse Carbide Segregations in High Speed Steels.** Karlheinz Werner. *Metallurgie,* v. 5, no. 8, Aug. 1955, p. 252-258.

Literature, personal experiments and statistical facts used to arrive at 12 measures. Photograph, graphs, tables, diagram, micrographs. 42 ref. (N12, TS)

417-N. (Hungarian.) **The Crystallization of Graphite in Cast Iron. II.** Istvan Karsay. *Kohaszati lapok,* v. 10, no. 9, Sept. 1955, p. 205-210.

Various hypotheses on the crystallization process; conditions for the formation of spheriodal graphite. Micrographs. 36 ref. (N8, N12, CI, C-a)

418-N. The Alloy Growth Rate of 0.25 Pound Electrolytic Tin Plate in the Temperature Range, 380-440° F. William N. Lambert. *Corrosion,* v. 11, Oct. 1955, p. 454-458.

Samples were immersed from 5 sec. to 30 min. in an oil bath at four temperatures below the melting point of tin and the growth of the tin-iron alloy, for each temperature and initial alloy layer, was plotted. Tables, graphs. 5 ref. (N1, N12, Fe, ST, Sn)

419-N. Metallography of Delta-Ferrite. II. Formation of Delta-Eutectoid in 18-4-1-Type High-Speed Steels. III. Isothermal Transformation of Delta-Ferrite in Low-Carbon 27-5-1·5 Cr-Ni-Mo Corrosion-Resistant Steel. Kehsin Kuo. *Iron and Steel Institute, Journal,* v. 181, Oct. 1955, p. 128-137 + 8 plates.

Overheating, burning, solidification, carbon content and rate of cooling effect on formation of delta-ferrite and its decomposition to austenite and iron-tungsten-carbide. Micrographs, graph. 35 ref. (N8, TS)

420-N. Kinetics of Precipitation in Aluminium-Silver Alloys. G. Borelius. Paper from "Defects in Crystalline Solids". The Physical Society, p. 169-174.

This system is chosen for study because of the high solubility of silver in aluminum, 40 at. % at the eutectic, 558° C. Graphs. 11 ref. (N7, Ag, Al)

421-N. Structure and Anisotropy of Diffusion in Grain Boundaries. R. Smoluchowski. Paper from "Defects in Crystalline Solids". The Physical Society, p. 197-202.

Diffusion of silver in a grain boundary of copper as a function of the angle between the direction of diffusion and the common cubic direction of the grains was studied for various angles of disorientation of the grains. Results indicate a definite anisotropy, the highest rate of diffusion being in the common cubic direction. Graphs. 12 ref. (N1, Ag, Cu)

422-N. Diffusion Short Circuits and Their Role in Precipitation. D. Turnbull. Paper from "Defects in Crystalline Solids." The Physical Society, p. 203-211.

Dislocation channels and elements of incoherent grain boundaries are almost equally effective short circuits for the self-diffusion of silver. The rate of cell growth in cellular precipitation ('discontinuous' precipitation) of tin from lead and of silver from copper is controlled by the rate of diffusion of solute atoms in the cell boundary. Graphs. 29 ref. (N1, N7, Ag, Cu, Pb, Sn)

423-N. Work Hardening in Copper Crystals. T. H. Blewitt, R. R. Coltman and J. K. Redman. Paper from "Defects in Crystalline Solids". The Physical Society, p. 369-382 + 2 plates.

Earlier work shows that the effect of temperature on the work hardening of face-centered cubic metals is much different from that customarily assumed. The objective of this work is to remedy, in small part, this deficiency of experimental data on the low-temperature deformation of single crystals. Table, diagram, graphs, micrographs. 10 ref. (N7, Q24, Cu)

424-N. Transient Heat Conduction in Multiphase Media. J. H. Weiner. *Journal of Applied Physics,* v. 6, Oct. 1955, p. 361-363.

An analytical solution obtained for problem of a semi-infinite mass of material initially at a uniform temperature, the surface of which is maintained at a different constant temperature, where the material may change phase an arbitrary number of times in passing from its initial to its final temperature. Numerical example of application of the solution to the analysis of the solidification of 0.2% carbon steel, comparison between theoretical solution, experimental results and an electrical analogue solution of the same problem. Graphs. 4 ref. (N12, ST)

425-N. Mechanisms of Permeation of Silver, Copper and Mercury Gases of Solid Graphite Walls. Russell K. Edwards and James H. Downing. *Journal of Physical Chemistry,* v. 59, Oct. 1955, p. 1079-1083.

Mercury and silver may pass through walls by mechanism of capillary flow, copper by activated diffusion. Diagram, graphs, table. 14 ref. (N1, Ag, Cu, Hg)

426-N. A Study of the Final Stages of the Austenite to Martensite Transformation in SAE 1050 Steel. Melvin R. Meyerson and Samuel J. Rosenberg. *Journal of Research, National Bureau of Standards,* v. 55, Sept. 1955, p. 177-181.

Curves in temperature range from Ms to −320° F. have been established for two steels. Tables, micrographs, photographs, graphs. 12 ref. (N8, ST)

427-N. Diffusion of Gases Through Metals. II. Diffusion of Hydrogen Through Poisoned Palladium. W. D. Davis. *Knolls Atomic Power Laboratory (U. S. Atomic Energy Commission),* KAPL-1375, Apr. 1955, 54 p.

Effect of temperature, pressure and prior treatment on permeability. Graphs, diagram. 7 ref. (N1, Pd)

428-N. (German.) **Investigation of Intermediate Stages in Transformation of Manganese Steels.** Winfried Dahl, Werner Jellinghaus, and Eduard Houdremont. *Archiv für das Eisenhüttenwesen,* v. 26, no. 10, Oct. 1955, p. 589-597.

Study of four steels with 0.6 to 1.2% carbon, and 1.9 to 4.1% manganese; influence of temperature; shifting of martensite point; determination of activation energy. Graphs, table. 20 ref. (N8, P12, ST)

429-N. (German.) **Crystallization of Undercooled Metal Alloys.** Werner Geller and Hans Garbeck. *Archiv für das Eisenhüttenwesen,* v. 26, no. 10, Oct. 1955, p. 611-621.

Nucleus formation and crystal growth; influence of foreign nuclei on undercooling ability of metals and alloys; thermo-analytical and metallographical investigation of undercooled alloys with formation of a normal eutectic and one of mixed crystals; undercooling ability of the system Fe-Fe_3P and the unstable system Fe-Fe_2P. Graphs, tables, micrographs. 46 ref. (N12, Fe)

430-N. (German.) **Interference Diagram of Solid and Liquid Selenium.** Gerhard Frohnmeyer, Hans Richter and Gerhard Schmelzer. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 689-692.

Curves of solid amorphous selenium at 20° C. and liquid selenium at 230 and 420° C., obtained by counting tube goniometric method. Photographs, graphs, table. 9 ref. (N12, Se)

431-N. (Russian.) **Kinetics of the Alpha→Gamma Transformation During the Rapid Heating of Carbon Steel, With Pearlite Structure of Varying Degrees of Dispersion.** V. N. Svechnikov, V. N. Gridnev and Iu. A. Kocherzhinskii. *Doklady akademii nauk SSSR,* v. 103, no. 6, Aug. 21, 1955, p. 1025-1026.

Equations involving time, temperature of heating and thermal capacity. 11 ref. (N8, CN)

432-N. (Russian.) **Effect of Sulfur on the Graphitic Structure of Magnesium Cast Iron.** A. D. Ushakov. *Liteinoe proizvodstvo,* 1955, no. 9, Sept., p. 19-20.

Chemical composition of cast iron. Microstructures, with and without various FeS additions. Table, micrographs. (N8, M27, CI)

433-N. (Russian.) **Recrystallization of Austenite at High Temperatures.** M. G. Lozinskii and E. I. Antipova. *Stal',* v. 15, no. 9, Sept. 1955, p. 825-831.

New method of studying microstructure of different types of steel when heated in vacuum has brought out peculiarities of recrystallization process. Photographs, micrographs, graphs, table. 13 ref. (N5, N8, AY)

434-N. (Russian.) **Solid-Phase Reaction of the Interaction of Nickel With Zinc.** Ia. A. Ugai and Iu. A. Baslyk. *Zhurnal obshchei khimii,* v. 25, no. 9, Sept. 1955, p. 1645-1651.

Reaction studied by physical-chemical methods; significance of liquid phase in the mechanism of the solid-phase reactions; role of NiZn and $NiZn_3$ compounds. Graphs, phase diagram. 17 ref. (N12, Zn, Ni)

SECTION P

PHYSICAL PROPERTIES and TEST METHODS

1-P. Magnetochemistry of the Heaviest Elements. VIII. Metallic Plutonium. J. K. Dawson. *Chemical Society, Journal,* 1954, Oct., p. 3393-3396.

Magnetic susceptibility of metallic plutonium measured up to 350° C. Indications of structure transitions were observed at 119, 205 and about 300° C. Tables, graphs. (P16, Pu)

2-P. Anodic Behavior of Copper in HCl. Lee Stephenson and J. H. Bartlett. *Electrochemical Society, Journal,* v. 101, Nov. 1954, p. 571-581.

Electrical and optical studies of current and voltage variations and their causes. Diagram, graphs, photographs, micrographs. 18 ref. (P15, Cu)

3-P. A Calorimetric Investigation of Heats of Formation and Precipitation in Some Cu-Sn Alloys. J. B. Cohen, J. S. L. Leach and M. B. Bever. *Journal of Metals,* v. 6; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1257-1258.

Test data for alloys containing 8.10 and 37.95% tin. (P12, Cu, Sn)

4-P. (French.) **Nickel Alloys Having a High Secondary Power of Emission.** Albert Bobenrieth, Jacques Millet and Stanislas Teszner. *Comptes rendus,* v. 239, no. 14, Oct. 4, 1954, p. 794-796.

Results of work on nickel-beryllium and nickel-magnesium alloys. Tables. 3 ref. (P17, Ni, Be, Mg)

5-P. (French.) **Magnetic Materials.** R. Vautier. *Métaux, Corrosion-Industries,* v. 29, no. 349, Sept. 1954, p. 347-300.

Magnetic properties and current ideas on elementary mechanisms of magnetization. Graphs, tables. 26 ref. (P16, SG-n)

6-P. (German.) **The Jordan Hysteresis in Ferromagnetic Sheet Metals.** Richard Feldtkeller and Günther Sorger. *Zeitschrift für angewandte Physik,* v. 6, no. 9, Sept. 1954, p. 390-396.

Measurement of complex permeability as function of frequency, field strength and temperature; explanation of the Jordan hysteresis by Neels theory on irreversible magnetic viscosity and by the Barkhausen effects. Table, graphs. 20 ref. (P16)

7-P. (Russian.) **Thermo-Electron Emission of Copper at the Melting Point.** V. G. Bol'shov and L. N. Dobretsov. *Doklady Akademii Nauk SSSR,* v. 98, no. 2, Sept. 11, 1954, p. 193-196.

Apparatus used, equations formulated and magnitude and sign of the temperature coefficient. Diagrams, graph, table. 4 ref. (P15, Cu)

8-P. Coefficients of Thermal Expansion of Solids at Low Temperatures. I. The Thermal Expansion of Copper From 15 to 300° K. Thor Rubin, Howard W. Altman, and Herrick L. Johnston. *American Chemical Society, Journal,* v. 76, Nov. 5, 1954, p. 5289-5293.

Apparatus for measuring thermal expansion of solids over the temperature range 15 to 300° K. by a differential method making use of a Fizeau interferometer. Experimental data for copper. Diagrams, tables, graphs. 15 ref. (P11, Cu)

9-P. Thermal Expansion of Lithium, 77° to 300° K. W. B. Pearson. *Canadian Journal of Physics,* v. 32, Nov. 1954, p. 708-713.

Measurements of lattice parameters, methods of low-temperature X-ray photography. Diagram, graph, table. 19 ref. (P11, Li)

10-P. The Viscosity of Copper and Some Binary Copper Alloys. W. R. D. Jones and W. L. Bartlett. *Institute of Metals, Journal,* v. 83, Oct. 1954, p. 59-63.

All viscosity-temperature curves show inflection near the liquidus. Diagram, graphs. 2 ref. (P10, Cu)

11-P. Physical Chemistry of Steel. II. Experimental Evidence. J. A. Kitchener. *Iron & Steel,* v. 27, Nov. 1954, p. 523-526.

Thermodynamics and structure of solutions in liquid iron. Table, graphs. 20 ref. (P12, N14, ST)

12-P. Electron Emission From Metals Under High-Energy Ion Bombardment. B. Aarset, R. W. Cloud and J. G. Trump. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1365-1368.

Electron emission from aluminum, gold, iron, magnesium, nickel and lead surfaces bombarded by atomic and molecular hydrogen ions. Diagram, table, graphs. 10 ref. (P15, Al, Au, Fe, Mg, Ni, Pb)

13-P. An Estimation of Some Unknown Surface Tensions for Metals. J. W. Taylor. *Metallurgia,* v. 50, no. 300, Oct. 1954, p. 161-165.

Calculations for 27 metals in cases where experimental data are lacking. Indirect experimental data substantiate estimated values. Tables, graphs. 26 ref. (P10)

14-P. A Search for Natural Radioactivity in Neodymium, Rhenium and Osmium. D. Dixon and A. McNair. *Philosophical Magazine,* v. 45, 7th ser., no. 370, Nov. 1954, p. 1099-1108.

Isotopes appear to have half-lives of the order of 10^{15} yr. Graphs, tables. 24 ref. (P13, Nd, Rh, Os)

15-P. Statistics of the Occupation of Dislocation Acceptor Centres. W. T. Read, Jr. *Philosophical Magazine,* v. 45, 7th ser., no. 370, Nov. 1954, p. 1119-1128.

Electrical effects of dislocations in germanium. Graphs. (P15, M26, Ge)

16-P. Electrical and Optical Properties of Intermetallic Compounds. I. Indium Antimonide. R. G. Breckenridge, R. F. Blunt, W. R. Hosler, H. P. R. Frederikse, J. H. Becker and W. Oshinsky. *Physical Review,* v. 96, ser. 2, Nov. 1, 1954, p. 571-575.

Measurement of electrical conductivity, Hall effect and optical absorption. Graphs, tables. 19 ref. (P15, P17, In, Sb)

17-P. (French.) **Study of Laminated Iron-Nickel Alloys Around the Curie Point by Means of Weak Alternating Fields.** André Marais. *Comptes rendus,* v. 239, no. 15, Oct. 11, 1954, p. 873-875.

Study of the ferromagnetism of iron-nickel alloys after one or several annealings in hydrogen above the Curie temperature. Graphs, table. 6 ref. (P16)

18-P. (French.) **Magnetic Properties of Some Rare Earth Metals and Oxides.** Charlotte Henry la Bilanchetais. *Journal des recherches du centre national de la recherche scientifique,* 1954, no. 28, Sept., p. 32-41.

Preparation of metallic cerium free of iron by a process of successive electrolyses of cerium salt. Preparation of cerium oxide and mixtures of rare earth oxides free of hydrates and carbonates. Magnetic properties at various temperatures. Diagrams. 24 ref. (P16, C23, Ce)

19-P. (German.) **Solubility of Several Transition Metals in Mercury.** J. F. de Wet and R. A. W. Haul. *Zeitschrift für anorganische und allgemeine Chemie,* v. 277, nos. 1-2, Sept. 1954, p. 96-112.

Preparation of the amalgams, spectrochemical, colorimetric and electron microscope studies, behavior of manganese and nickel. Tables, diagram, graph, micrograph. 30 ref. (P13, N12, Mn, Ni, Hg)

20-P. (Russian.) **The Hall Effect and the Variation in the Resistance of Lead, Copper, and Magnesium in a Magnetic Field.** E. S. Borovik. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 27, no. 3 (9), Sept. 1954, p. 355-368.

Comparison of experimental data and theoretical calculations over the range 2 to 300° C. Graphs, tables, 31 ref. (P15, P16, Pb, Cu, Mg)

21-P. R.F. Conductivity in Copper at 8MM Wavelengths. J. S. Thorp. *Institution of Electrical Engineers, Proceedings,* v. 101, pt. 3, no. 74, Nov. 1954, p. 357-359.

Conductivity may be considerably reduced below the d.c. value by surface layers of low conductivity and by stress in the bulk material. Diagrams, tables, graphs. 7 ref. (P15, Cu)

22-P. Physical Chemistry of Steel. III. Interaction Effects Between Solutes. J. A. Kitchener. *Iron & Steel,* v. 27, Dec. 1954, p. 553-556.

Thermodynamics and structures of solutions in liquid iron. Interactions of carbon, sulfur, oxygen, silicon and nitrogen. Graphs. 22 ref. (To be concluded.) (P12, ST)

23-P. Relationship Between Coercive Force of Soft Magnetic Materials and Thickness of Sheet. V. A. Zaikova and Ya. S. Shur. *Henry Brutcher, Altadena, Calif., Translation no.* 3333, 5

p. (From *Doklady Akademii Nauk SSSR,* v. 94, no. 4, 1954, p. 663-665.)

Previously abstracted from original. See item 311-P, 1954.
(P16, Fe, Ni, Si)

24-P. Contributions to the Data on Theoretical Metallurgy. XII. Heats and Free Energies of Formation of Inorganic Oxides. James P. Coughlin. *U. S. Bureau of Mines Bulletin* 542, 1954, 80 p.

Data for evaluating heat balances in metallurgical processes, appraising improvements in extractive methods, and as a guide for developing better production methods. Tables. 169 ref. (P12)

25-P. Change in the Physical Properties of Cold-Drawn Brass During Annealing. G. I. Epifanov. *Henry Brutcher, Altadena, Calif., Translation no.* 3404, 11 p. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 16, no. 12, 1946, p. 1475-1482.)

Previously abstracted from original. See item 18-212, 1947.
(P15, J23, Cu)

26-P. (French.) **Some Magnetic Properties of the Alloy $MnAu_2$.** André J. P. Meyer and Pierre Taglang. *Comptes rendus,* v. 239, no. 16, Oct. 18, 1954, p. 961-963.

Variation of magnetization as a function of field strength and temperature. Graphs. (P16, Mn, Au)

27-P. (German.) **Property Changes During the Age Hardening of an Aluminum-Silicon Alloy.** Werner Köster and Willy Knorr. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 616-617.

Effect of annealing temperature and time on electrical, torsion, and hardness properties. Graphs. 4 ref. (P15, N7, J23, Q29, Al)

28-P. (Book.) **Properties of Surfaces.** Roy Waldo Miner, editor. v. 58, Annals of the New York Academy of Sciences. 250 p. 1954. New York Academy of Sciences, 2 East Sixty-Third St., New York 21, N. Y. $3.50.

Includes "The Life History of Adsorbed Atoms, Ions, and Molecules", Joseph A. Becker; "Absorbent-Adsorbate Interactions and Surface Heterogeneity in Physical Adsorption", J. M. Honig; "The Kinetics of Surface Properties", H. Austin Taylor; "The Effect of Monolayers on the Rate of Evaporation of Water", Robert J. Archer and Victor K. LaMer; "Classical Theory of Diffusion and the Oxidation of Metals", Earl A. Gulbransen; "Passivity and Adsorption", Herbert H. Uhlig; "Oxide Film Composition Studies", Thor N. Rhodin, Jr.; "Surface Studies With the Electron Microscope", C. J. Calbick; "The Adsorption of Dyes to Microcrystals of Silver Halide", W. West, B. H. Carroll, and D. L. Whitcomb; "Adsorption and Exchange in Metal-Metal Ion Systems", Cecil V. King; "The Adsorption of Gases and Vapors on Germanium", J. T. Law and E. E. Francois; "Electrical Conductivity of Germanium Surfaces", Edward N. Clarke; "Exploration of Metal Surfaces With Fine Wires", R. H. Savage and D. G. Flom; "Surface Properties of Germanium and Silicon", W. H. Brattain and C. G. B. Garrett; and "Stabilization of Metal Carbides by Nonmetallic Elements", Harry W. Podgurski.
(P10, P15, N1, R2)

29-P. Properties of Germanium Doped With Iron. I. Electrical Conductivity. W. W. Tyler and H. H. Woodbury. **II Photoconductivity.** R. Newman and W. W. Tyler. *Physical Review,* v. 96, ser. 2, Nov. 15, 1954, p. 874-886.

Method of preparation and electrical properties of the crystals; measurements on the spectral dependency of impurity photoconduction which yield values of impurity ionization energies. Graphs, diagram. 19 ref. (P15, Ge, Fe)

30-P. Recent Developments in Silicon Fusion Transistors. R. A. Gudmundsen, W. P. Waters, A. L. Wannlund and W. V. Wright. *Tele-Tech & Electronic Industries,* v. 13, Dec. 1954, p. 76-78, 149-150.

Review of silicon-tin and silicon-gold junction characteristics. Graphs, diagrams, photographs.
(P15, Si, Sn, Au)

31-P. (French.) **Electric Resistance at High Frequency and Low Temperatures of Thin Metallic Deposits.** Suzanne Offret and Boris Vodar, *Comptes rendus,* v. 239, no. 17, Oct. 27, 1954, p. 1027-1029.

At high frequency, the resistance is smaller and temperature coefficient higher, caused by intergranular capacities forming a short circuit. Graphs. 3 ref. (P15)

32-P. (French.) **Thermal Expansion of γ-Extruded Uranium.** Jean Bernard. *Revue de métallurgie,* v. 51, no. 11, Nov. 1954, p. 737-748.

Data for tests from room temperature to 900° C. Graphs, tables. 2 ref. (P11, U)

33-P. (German.) **The Absorption of Homogeneous Electrons in Aluminum.** G. Backenstoss. *Zeitschrift für Naturforschung,* v. 9a, no. 10, Oct. 1954, p. 886-890.

Explanation of the measured linear drop of number of particles of homogeneous electrons passing through aluminum. Comparison of measured with linear curves permits determination of intensity relations of different electron components and of the agreement between theoretical and experimental results. Graphs, table. 16 ref. (P10, Al)

34-P. (Portuguese.) **Thermal Expansion of Aluminum Alloy 24S-T.** R. M. Otto Weinbaum. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 34, Jan. 1954, p. 5-10.

Measuring apparatus and test data. Diagrams, graphs. (P11, Al)

35-P. (Czech.) **Magnetic Properties of Cast Steel.** Vladimir Zednik. *Slévarenstvi,* v. 2, no. 7, July, 1954, p. 193-200.

Effects of composition of carbon and low alloy steels. Graphs, tables, diagrams. (P16, CI)

36-P. (German.) **Experiments on the Improvement of the Magnetic and Mechanical Properties of Transformer Sheets From Different Sources.** Ernst Günther. *Metallurgie und Giessereitechnik,* v. 4, no. 10, Oct. 1954, p. 427-431.

Investigation of hot rolled sheets from three mills; effect of composition on magnetic and mechanical properties. Graphs. (P16, Q general, AY)

37-P. (Russian.) **The Nature of the Variations of Coercive Force During the Tempering of Quenched Low-Carbon Steel.** I. A. Bil'dziukevich, Ia. M. Golovchiner and G. V. Kurdiumov. *Doklady Akademii Nauk SSSR,* v. 98, no. 3, Sept. 21, 1954, p. 385-387.

Martensitic mechanism of transformation. Temperature of tempering. Graph. 15 ref. (P16, N8, J29, CN)

38-P. (Russian.) **Theory of the Drop in Coercive Force During Low-Temperature Tempering of Quenched Low-Carbon Steel.** N. S. Fastov. *Doklady Akademii Nauk SSSR,* v. 98, no. 3, Sept. 21, 1954, p. 391-393.

Mathematical treatment; redistribution of stresses. 4 ref. (P16, J29, CN)

39-P. (Russian.) **Measuring the Magnetic Properties of Test Rods by the Method of Removing the Test Rod [From the Coil].** A. I. Parfent'ev and G. A. Sheneman. *Elektrichestvo,* 1954, no. 10, Oct., p. 66-68.

Direct measurement of residual magnetism. Graphs, diagram. (P16, Fe)

40-P. (Russian.) **Thermodynamic Investigations at Low Temperatures. V. Melting, Premelting, and False Phase Transition of Mercury.** V. N. Kostriukov and P. G. Strelkov. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 10, Oct. 1954, p. 1825-1830.

Thermal capacity of solid, liquid and supercooled mercury. Premelting of mercury contaminated by zinc and thallium. Graphs, table. 11 ref. (P12, Hg)

41-P. (Russian.) **Improving the Magnetic Characteristics of Transformer Iron by Treating It Electrochemically.** S. Ia. Grilikhes. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 10, Oct. 1954, p. 1786-1787.

Effect of thermo-electric treatment on magnetic penetrability and hysteresis losses. Decreasing cold-hardening of surface layer. 2 ref. (P16, Fe)

42-P. Thermochemical Investigations of Alloys. O. J. Kleppa. *American Chemical Society, Journal,* v. 76, Dec. 5, 1954, p. 6028.

Silver-antimony, -tin, -cadmium and -indium alloys studied in a high-temperature (to 500° C.) calorimeter. Graph. 2 ref. (P13, Ag, Cd, In, Sb, Sn)

43-P. Radiotracer Study of Electrochemical Displacement on Metals. M. Simnad, A. Spilners and Ling Yang. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 6, v. 31, 1954, 6 p.

Factors influencing displacement of silver from silver nitrate solutions by copper, iron and nickel. Graphs. 5 ref. (P15, Ag, Cu, Fe, Ni)

44-P. The Surface Tension of Sodium. J. W. Taylor. *Institute of Metals, Journal,* v. 83, Dec. 1954, p. 143-152.

Temperature coefficient from 98 to 450° C. Effects of oxide film. Diagrams, graphs, tables. 27 ref. (P10, Na)

45-P. Thermodynamic Calculation of Slag Equilibria. II. Influence on Cation Exchange Equilibria Caused by Cations Not Taking Part in the Exchange. K. Grjotheim. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 354-356.

Theoretical explanation of experimental data. Table, graph. 5 ref. (P12, D general, ST)

46-P. Thermal Conductivities of Solid Materials at High Temperatures. R. W. Powell. *Research,* v. 7, Dec. 1954, p. 492-501.

Relevant data for thermal conductivities of metals, alloys and other

refractory materials. Tables, graphs. 53 ref.
(P11, Fe, CI, ST, Al, Cu, Mg, Ni, Ti)

47-P. (English.) **The Magnetic Properties and Their Temperature Dependence of Ferromagnetic Alloys With an Order-Disorder Transformation. I. Ni_3Fe. II. Ni_3Mn.** Tadami Taoka and Taiichiro Ohtuska. *Physical Society of Japan, Journal,* v. 9, no. 5, Sept.-Oct. 1954, p. 712-729.

Change of magnetic properties at ordering temperatures, test apparatus and technique. Tables, diagram, graphs. 40 ref. (P16, N10, Ni, Fe)

48-P. (English.) **The Magnetostriction Constants of Silicon Steel. II.** Hideo Takai and Yoji Nakamura. *Physical Society of Japan, Journal,* v. 9, no. 5, Sept.-Oct. 1954, p. 748-752.

Kaya's law confirmed for single crystals of 2.6, 3.2 and 4.0% silicon steel. Tables, graphs. 9 ref.
(P16, AY)

49-P. (Czech.) **Magnetic Properties of Cast Steel.** Vladimir Zednik. *Slévarenstvi,* v. 2, no. 8, Aug. 1954, p. 231-236.

Theoretical assumptions, effects of alloy additions and deoxidation practice on magnetic and mechanical properties. Tables, graphs, micrographs, photograph. 5 ref.
(P16, Q general, CI)

50-P. (French.) **Convection by Thin Wires and Nature of the Metal-Gas Interface.** Israel Epelboin and André Vapaille. *Comptes rendus,* v. 239, no. 21, Nov. 22, 1954, p. 1363-1365.

For small dissipations of heat, the nature of the metal and surrounding gas strongly influences natural convection by thin wires. Graphs, table. (P11)

51-P. (German.) **Electrical Conductivity of Aluminum.** E. Nachtigall. *Aluminium,* v. 30, no. 12, Dec. 1954, p. 529-533.

Effect of amount and type of impurities, structure and cold working. Graphs, table. (P15, Al)

52-P. (German.) **The Electrical Measurement of the Loss Number of Electrolytic Sheet Iron. I. Principles.** H. Poleck. *Archiv für technisches Messen,* 1954, no. 226, Nov., p. 253-256.

Causes of inductive distortion, formation of sinusoidal induction. Circuit diagrams, graphs. 8 ref.
(P15, Fe-a)

53-P. (German.) **Magnetic Anisotropy.** H. Hesselbach. *Metall,* v. 8, nos. 23-24, Dec. 1954, p. 929-935.

Theory of anisotropy, production of silicon-iron and nickel-iron alloys for electrical equipment. Diagrams, micrographs, graphs, tables. 6 ref.
(P16, T1, Si, Fe, Ni)

54-P. (Russian.) **Measurement of Vapor Pressure of Solid Antimony by the Method of Tagged Atoms.** An. N. Nesmeianov and B. Z. Iofa. *Doklady Akademii Nauk SSSR,* v. 98, no. 6, Oct. 21, 1954, p. 993-995.

Apparatus and experimental data in the temperature range from 345 to 588° C., using antimony-124 as the tracer isotope. Graph, diagrams, table. 7 ref. (P12, Sb)

55-P. (Russian.) **Surface Tension of Binary Metal Alloys Having Space-Centered and Face-Centered Structures.** A. E. Glauberman and A. M. Muzychuk. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1615-1622.

New formulas for determination with the surface tension of corresponding alloys expressed by values of "effective charges" characterizing the components of the alloys. Diagrams. 4 ref. (P10)

56-P. (Russian.) **Theory of Surface Tension of Binary Metal Alloys.** A. E. Glauberman. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1623-1627.

New theory, based on concept of the quasi-heterogeneity of metal atoms in alloys. Diagram. 7 ref.
(P10)

57-P. (Book.) **Liquid Metals Handbook.** Richard N. Lyon, editor. 2nd Rev. Ed. 269 p. 1954. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $1.25.

Properties of metals melting below 660° C. Emphasis is on heat transfer applications.
(P11, P10, Q general)

58-P. **Viscosity of the Sodium-Potassium System.** C. T. Ewing, J. A. Grand and R. R. Miller. *Journal of Physical Chemistry,* v. 58, Dec. 1954, p. 1086-1088.

Studies extended to 700° C. Tables. 5 ref. (P10, Na, K)

59-P. **A Direct Reading Instrument for the Measurement of Small Displacements.** W. D. Corner and G. H. Hunt. *Journal of Scientific Instruments,* v. 31, Dec. 1954, p. 445-447.

Principle and operation of apparatus for measuring magnetostriction of small crystals of nickel with an accuracy of 1% and displacements to 10^{-7} cm. Diagram, graph, circuit diagram. 2 ref. (P16, Ni)

60-P. **Method of Determining Temperature Coefficient of Electronic**

Core Material. R. H. Rodrian. *Metal Powder Association, Proceedings,* v. 2, 1954, p. 78-82; disc., p. 82-83.

Techniques for determining thermal stability of high-frequency components. Circuit diagrams.
(P12, H11, Fe)

61-P. Resistivity and Hall Effect of Germanium at Low Temperatures. C. S. Hung and J. R. Gliessman. *Physical Review,* v. 96, ser. 2, Dec. 1, 1954, p. 1226-1236.

Investigates activation of impurity states, behavior of the degenerate electron gas and theory of scattering. Diagrams, graphs, tables. 20 ref. (P15, Ge)

62-P. The Electrical and Thermal Conductivities of Monovalent Metals. J. M. Ziman. *Royal Society, Proceedings,* v. 226, ser. A, Dec. 7, 1954, p. 436-454.

Recalculation of conductivities at all temperatures, with objections to and modifications of the Bloch theory. Treatment of electron scattering by thermal lattice vibrations. Graphs, diagram, table. 25 ref.
(P15, P12)

63-P. Thermal Conductivity of Metals and Alloys at Low Temperatures. Robert L. Powell and William A. Blanpied. *U. S. National Bureau of Standards Circular* 556, Sept. 1954, 68 p.

Compilation and review of existing data covering nearly all metals. Tables, graphs. Approx. 200 ref.
(P12)

64-P. (English.) **The Resistivity-Temperature-Concentration Relationships in the System Niobium-Titanium.** S. L. Ames and A. D. McQuillan. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 831-836.

Additions of titanium cause progressive increase in resistivity and a decrease in temperature coefficient of resistance. Graphs, diagram, micrograph. 8 ref.
(P15, Cb, Ti)

65-P. (French.) **Electrical Resistance of Castings.** *Fonderie,* 1954, no. 106, Nov., p. 4241-4246.

Different factors influencing electrical resistance of cast iron. Tables, graph. 8 ref. (P15, CI)

66-P. (German.) **The Melting Point of Indium.** S. Valentiner. *Zeitschrift für anorganische und allgemeine Chemie,* v. 277, nos. 3-4, Nov. 1954, p. 201-204.

Determination by platinum resistance thermometer and its application to the calibration of thermoelements. Table. 9 ref. (P12, In)

67-P (German.) **The Theory of Electrical Resistance of Good Metallic Conductors.** Claus-Adolf Busse and Fritz Sauter. *Zeitschrift für Physik,* v. 139, no. 4, 1954, p. 440-447.

Proposes a relationship between electrical resistance and other physical characteristics of alkali metals by treating the vibrating ion lattices as elastic ion continuums. Tables. 4 ref. (P15, EG-e)

68-P. Determination of the Vapor Pressure of Sodium. M. M. Makansi, C. H. Muendel and W. A. Selke. *Journal of Physical Chemistry,* v. 59, Jan. 1955, p. 40-42.

Data for range 0.047 to 6.489 atmospheres. Tables, graph. 6 ref.
(P12, Na)

69-P. Theory of Donor and Acceptor States in Silicon and Germanium. C. Kittel and A. H. Mitchell. *Physical Review,* v. 96, ser. 2, Dec. 15, 1954, p. 1488-1493.

Evaluation of Wannier equation. Includes degenerate bands. Shows fair agreement with experiment. Graph. 10 ref. (P15, Si, Ge)

70-P. Transverse Hall and Magnetoresistance Effects in *p*-Type Germanium. R. K. Willardson, T. C. Harman and A. C. Beer. *Physical Review,* v. 96, ser. 2, Dec. 15, 1954, p. 1512-1518.

Modification of the two-band model to include existence of a small number of high-mobility holes gives closer agreement with experiments. Graphs, table. 25 ref.
(P15, P16, Ge)

71-P. Electrical and Optical Properties of Indium Selenide. R. W. Damon and R. W. Redington. *Physical Review,* v. 96, ser. 2, Dec. 15, 1954, p. 1498-1500.

Photoconductive response was mostly in the visible; sensitivity is comparable with that of gray selenium. Graphs. 5 ref.
(P15, P17, In, Se)

72-P. (Polish.) **Change of Free Energy in Oxidation Reactions of Common Materials Important in Steelmaking.** Jan Bochenek and Eugeniusz Ptak. *Archiwum Gornictwa i Hutnictwa,* v. 2, no. 1, 1954, p. 57-69.

Values for aluminum, calcium, chromium, magnesium and nickel from 1700 to 2000° K. Tables. 4 ref.
(P12, D general, Al, Ca, Cr, Mg, Ni)

73-P. (Polish.) **Coefficients of Activity of Some Non-Ferrous Metals in Binary Solid and Liquid Solutions.** Wladyslaw Ptak. *Archiwum Gornictwa i Hutnictwa,* v. 2, no. 1, 1954, p. 71-122.

Calculations based on methods given by A. Krupkowski for nickel-carbon, tin-lead, copper-silver, copper-nickel, bismuth-mercury, tin-zinc, bismuth-copper, cadmium-zinc, bismuth-cadmium and bismuth-tin alloys. Tables, graphs. 37 ref.
(P12, Ni, Sn, Pb, Cu, Ag, Bi, Hg, Zn, Cd)

74-P. (Russian.) **Equation of Thermoconductivity.** N. N. Meiman. *Doklady Akademii Nauk SSSR,* v. 99, no. 2, Nov. 11, 1954, p. 209-212.

Proposes new solution of Cauchy problem for the general, linear and nonlinear thermoconductivity equation. 1 ref. (P11)

75-P. (Russian.) **Determination of Vapor Pressure and Heat of Sublimation of Cobalt in the Range From 1050 to 1250° C.** Iu. V. Kornev and V. N. Golubkin. *Doklady Akademii Nauk SSSR,* v. 99, no. 4, Dec. 1, 1954, p. 565-567.

Investigation by discharge of vapor from small nozzle and use of radioactive tracers of Co^{60}. Graph, table. 9 ref. (P12)

76-P. (Russian.) **Relation Between Heat Resistance of Crystals and Their Coefficients of Linear Expansion.** V. P. Zhuze. *Doklady Akademii Nauk SSSR,* v. 99, no. 5, Dec. 11, 1954, p. 711-714.

The linear dependence of heat resistance on the square of the coefficient of linear expansion holds only for materials in which heat transfer is accomplished basically by phonons. Graph, table. 16 ref. (P11, Ge, In, Sb, Si, Fe, Al, Mg, Te, Pb, Ag, Li)

77-P. (Russian.) **Problem of Superconductivity of Thin Films of Tantalum and Columbium.** I. Khukhareva and A. Shal'nikov. *Doklady Akademii Nauk SSSR,* v. 99, no. 5, Dec. 11, 1954, p. 735-736.

Investigates relation between critical transition temperature and thickness of films obtained by cathodic diffusion during high-vacuum evaporation. Graphs. 2 ref.
(P15, Cb, Ta)

78-P. (Russian.) **Investigation of the Temperature Relation of the Thermal and Electric Conductivities of Iron-Copper-Graphite Porous Antifriction Alloys.** V. E. Mikriukov and N. Z. Pozdniak. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* v. 9, no. 9, Sept. 1954, p. 51-59.

Chemical compositions of starting materials; data after sintering; effect of copper content. Tables, graphs, micrographs. 5 ref.
(P11, P15, H11, Fe, Cu, Mn)

79-P. (Russian.) **Problem of the Superconductivity of Bi_2Pd.** N. E. Alekseevskii, N. N. Zhuravlev and I. I. Lifanov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 27, no. 1, July 1954, p. 125-126.

Indicates existence of two modified forms induced by different heat treatments which have different temperatures of transition into the superconductive state. Diagrams. 5 ref. (P15, Bi, Pd)

80-P. (Russian.) **Thermal Conductivity of Phosphor Bronze at Liquid Helium Temperatures.** R. A. Chentsov. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 27, no. 1, July 1954, p. 126-128.

Modification of Kohlrausch's method determines relationship between heat and electroconductivity. Diagrams, tables. 6 ref.
(P11, P15, Cu)

81-P. (Russian.) **Use of the Method of Electromotive Forces for the Study of Liquid Manganese Alloys.** O. A. Esin and N. A. Vatolin. *Zhurnal Prikladnoi Khimii,* v. 27, no. 12, Dec. 1954, p. 1252-1256.

Activity of separate components calculated; effect of carbon and silicon. Tables, graph. 4 ref.
(P12, Si, Mn, Fe)

82-P. (Swedish.) **High Temperature Chemistry.** Lars Gunnar Sillén. *Jernkontorets Annaler,* v. 138, no. 12, 1954, p. 759-778.

Behavior of matter at different temperatures; dependence of equilibrium constants; comparison between solution chemistry of metal and slag melts at 1600° C. Graphs, tables, nomograms. 37 ref. (P12, Zr, W, Au, Al, Si, Ti, Ta, Th, Mg, Mo, Fe, Cu, Zn, Pt, Hg, Na)

83-P. **Factors Influencing the Reactivity of Solids With Particular Reference to Metals.** J. Arvid Hedvall. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group I, 50-53.

Survey of factors influencing solid reactions. Graphs. 22 ref. (P13)

84-P. **Melting Point of Germanium and the Constitution of Some Ge-Ga Alloys.** E. S. Greiner and P. Breidt, Jr. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 187-188.

Thermal analysis data. Graphs, table. 9 ref. (P12, M24, Ge, Ga)

85-P. **Thermal Conductivity of Uranium and Several Uranium Alloys.** James L. Weeks. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of*

Mining and Metallurgical Engineers, Transactions, v. 203, Jan. 1955, p. 192.

Corrections for previously reported data. Table. 5 ref. (P11, U)

86-P. (Polish.) **Statistical Relation of Q_r to R_r in Heat Treated Steel** TR2. Zygmunt Jasiewicz. *Hutnik,* v. 21, no. 8, Aug. 1954, p. 249-255.

Collection of data on strength and quality factors. Graphs, tables. (P11, Q23, J general, AY)

87-P. (Book.) **Annual Review of Nuclear Science.** James G. Beckerley, Martin D. Kamen, and Leonard I. Schiff. v. LV. 483 p. 1954. Annual Reviews, Inc. Stanford, Calif.

Seventeen papers covering recent work on particles, isotopes, accelerators, reactions, radiochemistry, counters, and radioactivity. (P general, M25)

88-P. (Book.) **Matter Energy Mechanics.** Jakob Mandelker. 73 p. 1954. Philosophical Library, 15 East 40th St., New York, N. Y. $3.75.

Unification and extension of relativistic mechanics; a new kinetic energy formula; concept of motion at speeds approaching the speed of light. (P general)

89-P. (Book.) **The Thermodynamics of the Steady State.** K. G. Denbigh. 103 p. 1951. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. (Also Methuen & Co., Ltd., London, England. 6s. 6d. net.)

Theory of open reaction systems. (P12)

90-P. Determination of the Thermal Conductivity of Molten Lithium. Henry A. Webber, David Goldstein and Robert C. Fellinger. *ASME, Transactions,* v. 77, Feb. 1955, p. 97-101; disc., p. 101-102.

Measurements for range of 420 to 1002° F. Diagrams, tables, graph. 7 ref. (P11, Li)

91-P. Nitrides of Chromium and Chromium-Titanium Alloys. New Film-Type Resistance Elements. E. R. Olson, E. H. Layer and A. E. Middleton. *Electrochemical Society, Journal,* v. 102, Feb. 1955, p. 73-76.

Electrical properties of nitrided chromium and chromium-titanium films. Diagram, graphs. 6 ref. (P15, Cr, Ti)

92-P. Hydrogen Overvoltage and Electrode Material. A Theoretical Analysis. Paul Rüetschi and Paul Delahay. *Journal of Chemical Physics,* v. 23, Jan. 1955, p. 195-199.

Shows on theoretical basis that overvoltage for hydrogen evolution on various metals and for otherwise identical conditions of electrolysis is essentially a linear function of heat of adsorption of atomic hydrogen on the electrode. Graphs, tables. 40 ref. (P15, L17)

93-P. Determining Amount of Nitrogen and Nitrides in Fe-C Alloys. (Digest of "Thermodynamics of Metal Nitrides and of Nitrogen in Iron and Steel", by J. Pearson and U. J. C. Ende, *Iron and Steel Institute, Journal,* v. 175, Sept. 1953, p. 52-58.) *Metal Progress,* v. 67, Feb. 1955, p. 172, 176, 178, 180.

Effects of steelmaking practices and melt composition on solubility of nitrogen in steel. (P12, D general, ST)

94-P. (English.) **Magnetic Properties of Yasugi Magnetic Pure Iron.** Sadao Koshiba and Terumi Nishinuma. *Hitachi Review,* 1954, no. 7, Oct., p. 37-43.

Greatest effect on magnetic properties is by rate of cold rolling. Tables, micrographs, graphs. 2 ref. (P16, Fe)

95-P. (English.) **Magneto-Thermoelectric Powers of Nickel Single Crystals.** Nahonori Miyata and Zenya Funatogawa. *Physical Society of Japan, Journal,* v. 9, no. 6, Nov.-Dec. 1954, p. 967-973.

Experimental determinations at various temperatures. Graphs, tales. 3 ref. (P15, P16, Ni)

96-P. (French.) **Negative and Positive Magnetocaloric Effect and the Magnetic States of the Compound $MnAu_2$.** André J. P. Meyer and Pierre Taglang. *Comptes rendus,* v. 239, no. 23, Dec. 8, 1954, p. 1611-1613.

Investigation of intrinsic magnetic properties of compound; relationship between magnetic field and temperature. Graphs. 4 ref. (P16, Mn, Au)

97-P. (German.) **Investigations of the Conduction Mechanism of Intermetallic Compounds.** Hermann Bruns and Günter Lautz. *Abhandlungen der Braunschweigischen Wissenschaftlichen Gesellschaft,* v. 6, 1954, p. 47-61.

Properties and structures of alloys in systems which may be identified by their metallic behavior or by their semiconducting properties; physical parameters determine nature of electronic condition. Graphs, phase diagram. 34 ref. (P15, Zn, Sb, In, Bi, Au, S)

98-P. (German.) **Investigations of Irreversible Magnetization and Hysteresis.** Jakob Kranz. *Zeitschrift für*

Physik, v. 139, no. 5, 1954, p. 619-637.
Apparatus for measuring Barkhausen effect which occurs in magnetic reversal of a ferromagnetic specimen. Diagrams, graphs, tables. 17 ref. (P16, Ni, Cu, CN, Fe)

99-P. Thermodynamics of Carbon Dissolved in Iron Alloys. III. Solubility of Carbon in Iron-Sulphur Melts. E. T. Turkdogan and R. A. Hancock. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 155-159 + 1 plate.
Determination at 1200, 1350 and 1500° C. shows that sulfur decreases solubility of carbon more than silicon and phosphorus. Tables, photographs, graphs. 9 ref. (P12, ST)

100-P. Some Physical Properties of Plutonium Metal. Eric R. Jette. *Journal of Chemical Physics,* v. 23, Feb. 1955, p. 365-368.
Melting points, densities, expansion coefficients, electrical resistance and magnetic susceptibility of metal of various degrees of purity. Graphs, tables. (P general, Pu)

101-P. Effect of Boron on the Relative Interfacial Tension of Gamma Iron. A. M. Adair, J. W. Spretnak and Rudolph Speiser. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 353-354.
Angles of grooves developed at grain-boundaries during heat etching in vacuum indicate that boron reduced the interfacial energy but not enough to explain its hardenability effects. Tables. (P10, AY)

102-P. Structure and Magnetic Properties of Some Transition Metal Nitrides. George W. Wiener and J. Alfred Berger. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 360-368.
Nitrogen appears to react with the *d*-shell so as to reduce magnetic moments. Tables, diagrams, micrographs, refractogram, graphs. 16 ref. (P16, Mn, Fe, Co, Ni)

103-P. A Calorimetric Investigation of the Energy Relations in Alloys of Composition Cu_3Au. L. R. Rubin, J. S. L. Leach and M. B. Bever. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 421-423.
Energies of formation in ordered and disordered solid solutions. Graph. 15 ref. (P12, N10, Cu, Au)

104-P. Enthalpy and Specific Heat of Four Corrosion-Resistant Alloys at High Temperatures. Thomas B. Douglas and James L. Dever. *Journal of Research, National Bureau of Standards,* v. 54, Jan. 1955, p. 15-19.
Experimental data for 80 nickel, 20 chromium, Type 347 stainless, Type 446 stainless from 0 to 900° C.; and for Monel from 0 to 300° C. Tables, graphs. 12 ref. (P12, Ni, Cr, Cb, Cu, SS)

105-P. Melting Points of Metals and Their Oxides. *Materials & Methods,* v. 41, Feb. 1955, p. 127, 129.
Data sheet. (P12)

106-P. Zeeman Effect of Gold. J. B. Green and H. N. Maxwell. *Optical Society of America, Journal,* v. 45, Feb. 1955, p. 98-102.
Experimental data for gold I and gold II. Tables. 10 ref. (P17, Au)

107-P. The [110] Magnetostriction of Some Single Crystals of Iron and Silicon-Iron. E. W. Lee. *Physical Society, Proceedings,* v. 68, no. 422A, Feb. 1955, p. 65-71.
Calculations based on intensity of magnetization and field strength, using the Néel model of domain structure. Graphs, table. 9 ref. (P16, Si, Fe)

108-P. Neutron Diffraction Studies of the Magnetic Structure of Alloys of Transition Elements. C. G. Shull and M. K. Wilkinson. *Physical Review,* v. 97, ser. 2, Jan. 15, 1955, p. 304-310.
Magnetic scattering and magnetic moments for ordered and disordered alloys in the iron-chromium, nickel-iron, cobalt-chromium and nickel-manganese systems. Graphs, tables. 5 ref. (P16, Fe, Cr, Ni, Co, Mn)

109-P. Trapping of Minority Carriers in Silicon. I. *P*-Type Silicon. J. A. Hornbeck and J. R. Haynes. *Physical Review,* v. 97, ser. 2, Jan. 15, 1955, p. 311-321.
Properties of two types of electron traps; deep-trap concentration is proportional to conductivity. Graphs, diagrams, photographs, table. 12 ref. (P15, Si)

110-P. Vibration Spectra and Specific Heats of Cubic Metals. I. Theory and Application to Sodium. A. B. Bhatia. *Physical Review,* v. 97, ser. 2, Jan. 15, 1955, p. 363-371.
Mathematical development; limitations of the model. Table, graphs. 18 ref. (P17, P12, Na)

111-P. Irradiation Effects in Cu, Ag, and Au Near 10° K. H. G. Cooper, J. S. Koehler and J. W. Marx. *Physical Review,* v. 97, ser. 2, Feb. 1, 1955, p. 599-607.

Electrical resistivity increases produced by 12 m.e.v. deuteron irradiation measured as a function of integrated deuteron flux. Diagrams, tables, graphs. 16 ref.
(P15, Cu, Ag, Au)

112-P. Measurements of Electrical Conductivity and Magnetoresistance of Gray Tin Filaments. A. W. Ewald and E. E. Kohnke. *Physical Review,* v. 97, ser. 2, Feb. 1, 1955, p. 607-613.
Preparation of gray tin filaments suitable for electrical measurements. Temperature dependence of electrical conductivity and magneto-resistance in pure gray tin and alloys containing various amounts of antimony, arsenic, indium, aluminum and zinc. Tables, graphs.
(P15, P16, Sn)

113-P. Band Model for Hall Effect, Magnetization, and Resistivity of Magnetic Metals. Emerson M. Pugh. *Physical Review,* v. 97, ser. 2, Feb. 1, 1955, p. 647-654.
Hall data, saturation magnetization and resistivity data for copper, nickel and cobalt, and their binary alloys can be made understandable by employing a four-band model, consisting of two 4*s* bands and two bands from the 3*d* shell. Graphs, diagrams. 21 ref.
(P15, P16, Cu, Co, Ni)

114-P. Resistance and Thermoelectric Measurements of Cold-Worked Copper and the Resistance Minimum at Low Temperatures. W. B. Pearson. *Physical Review,* v. 97, ser. 2, Feb. 1, 1955, p. 666-669.
Measurements of change of residual resistance ratio of copper as function of the percentage reduction in cross-sectional area by cold working in liquid helium, liquid nitrogen or at room temperature, and subsequent ageing treatments. Graphs. 19 ref. (P15, Cu)

115-P. Modulation of the Surface Conductance of Germanium and Silicon by External Electric Fields. G. G. E. Low. *Physical Society, Proceedings,* v. 68, no. 421B, Jan. 1955, p. 10-16.
Includes diagram, graphs. 4 ref. (P15, Si, Ge)

116-P. (English.) **Collective Electron Ferromagnetism and the Paramagnetism of Cobalt Alloys.** Hiroshi Watanabe. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 4, Aug. 1954, p. 343-374.
Studies above Curie temperatures suggest phase diagram changes. Tables, graphs, phase diagrams. 14 ref. (P16, M24, Fe, Co)

117-P. (English.) **On a New Anomaly in the Alloys of Nickel and Cobalt. I. The Effect of Heat Treatment in Magnetic Field on Their Magnetic Properties.** Hakaru Masumoto, Saburo Inoue and Itsujiro Ukaji. *Science Reports of the Research Institutes, Tohoku University.* ser. A, v. 6, no. 4, Aug. 1954, p. 375-383.
Permeability of a 60% cobalt alloy changed from 1050 to 16,600 after cooling. Tables, graphs. 6 ref.
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118-P. (English.) **The ΔE-Effect, Young's Modulus, and Magnetic Properties in Ferromagnetic Nickel-Copper Alloys.** Mikio Yamamoto. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 5, Oct. 1954, p. 446-457.
Results of dynamic measurements of Young's modulus and its change with magnetization. Ballistic measurements of ferromagnetic characteristics. Tables, graphs. 26 ref.
(P16, Q21, Cu, Ni)

119-P. (English.) **On a New Anomaly in the Alloys of Nickel and Cobalt. II. The Cause for the Effect of Magnetic Anneal.** Hakaru Masumoto, Hideo Saito and Tadashi Shioya. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 5, Oct. 1954, p. 462-468.
Variation in magnetic annealing effects in samples of different shapes. Graphs. 4 ref. (P16, Ni, Co)

120-P. (German.) **A Relationship Between Hysteresis Coefficient and Permeability. II. Additional Results of Measurements.** M. Kornetzki. *Zeitschrift für angewandte Physik,* v. 6, no. 12, Dec. 1955, p. 547-550.
Measurements on steels, aluminum and nickel alloys and ferrites. Table, graphs. 11 ref. (P16, SG-n)

121-P. (German.) **The Specific Heat of Nickel Between 180 and 1160° C.** Friedrich Krauss and Heinz Warncke. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 61-69.
Two methods of determining temperature dependence. Diagrams, graphs, tables. 25 ref. (P12, Ni)

122-P. (German.) **Self-Absorption of Beta-Activated Thallium in the Superconducting State.** Oswald Riedel and Fritz Schmeissner. *Zeitschrift für Physik,* v. 140, no. 1, 1955, p. 92-96.
It is experimentally shown that beta radiation of a sheet of thallium which contains the active Tl^{204} isotope does not change when the metal becomes superconducting. Diagram. 9 ref. (P15, Th)

123-P. (Russian.) **Electrical Properties of Bismuth Alloys. I. Solubility**

of Impurities and Nature of Their Effect on Electric Properties of Bismuth. II. Relation of Electrical Properties of Bismuth Alloys to the Impurity Concentrations. G. A. Ivanov and A. R. Regel'. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 39-65.

Experimental data on numerous binary and ternary alloys. Tables, graphs. 47 ref. (P15, Bi)

124-P. (Russian.) **Relation of Coercive Force to Thickness of Sheets of Iron-Silicon Alloys.** Iu. P. Burdakova and V. V. Druzhinin. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 108-111.

Effects of etching and rolling on magnetic properties. Graphs, table. 3 ref. (P16, ST)

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Experimental determination in ethyl alcohol solutions. Tables. 11 ref. (P15, Zn, Pb, Tl, Cd)

126-P. **A New High-Temperature Reaction Calorimeter. The Heats of Mixing of Liquid Lead-Tin Alloys.** O. J. Kleppa. *Journal of Physical Chemistry,* v. 59, Feb. 1955, p. 175-181.

Description and operation of calorimeter. Diagram, tables, graph. 18 ref. (P12, Pb, Sn)

127-P. **The Structure and Properties of Some Ternary Alloys of Manganese, Zinc and Carbon.** R. G. Butters and H. P. Myers. *Philosophical Magazine,* v. 46, 7th ser., no. 373, Feb. 1955, p. 132-143.

Effects of structure on magnetic properties. Tables, diagrams, graphs. 6 ref.
(P16, M general, Mn, Zn)

128-P. (English.) **Nuclear Electric Quadrupole Interactions in Aluminum.** T. J. Rowland. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 74-78.

Magnitude of electric gradients at aluminum lattice sites by solute atoms of magnesium or zinc; effects of precipitation and annealing. Graphs. 19 ref.
(P15, N7, J23, Al, Mg, Zn)

129-P. (English.) **Resistivity Changes in Silicon Single Crystals Induced by Heat Treatment.** C. S. Fuller, J. A. Ditzenberger, N. B. Hannay and E. Buehler. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 97-99.

Change in carrier concentration at various temperatures appear to be associated with the crystal-growing process. Graphs, photograph. 4 ref. (P15, N3, Si)

130-P. (German.) **A New Rhodium Isotope (106) With a Decay Period of 117 Minutes.** G. B. Baro, W. Seelmann Eggebert and I. E. Zabala. *Zeitschrift für Naturforschung,* v. 10a, no. 1, Jan. 1955, p. 80.

Extraction of the isotope and its radioactive properties. 1 ref. (P13, Rh)

131-P. (Russian.) **Temperature Dependence of Cobalt Magnetization in Weak Magnetic Fields.** T. A. Elkina. *Moskovskogo, Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* 1954, no. 12, Dec., p. 49-52.

Investigation in the temperature range 20 to 800° C. Graphs. 6 ref. (P16, Co)

132-P. (Russian.) **Semiconducting Properties of Certain High-Resistance Metallic Alloys.** A. I. Drabkin. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 81-84.

Properties of Constantan and Manganin before and after heat treatment. Tables. (P11, Cu, Ni, Mn)

133-P. (Book.) **The Theory of Cohesion.** M. A. Jaswon. Pergamon Science Series. Metal Physics and Physical Metallurgy. v. 11. 245 p. 1954. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. $5.75.

Mathematical and physical arguments involved in the theory of cohesion in aggregates, particularly in metals, which help bridge the gap between elementary and advanced treatments. (P10)

134-P. (Russian.) **Dependence of Electric Conductivity and Electron Emission on the Energy of a Metal in the Process of Heating by a High Density Current.** L. N. Borodovskaia and S. V. Lebedev. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 28, no. 1, Jan. 1955, p. 96-110.

Relationship between the melting points and electron emission of hot wires. Oscillograms, tables, graphs, diagram. 12 ref.
(P15, Ni, Au, W)

135-P. **The Heat of Formation of InSb.** O. J. Kleppa. *American Chemical Society, Journal,* v. 77, Feb. 20, 1955, p. 897-898.

Determined during a study of tin solution calorimetry. Table. 2 ref. (P12, In, Sb)

136-P. **Unit Weights of Metals.** George Sorkin and Willard H. Hawley, Jr. *Machine Design,* v. 27, Mar. 1955, p. 205-207.

Data sheet covering more than 240

types of ferrous and nonferrous metals. (P10, S22)

137-P. X-Ray Critical-Absorption and Emission Energies in Kev. S. Fine and C. F. Hendee. *Nucleonics,* v. 13, Mar. 1955, p. 36-37.

Data for 100 elements. Table. 6 ref. (P10)

138-P. Thermal Conductivity of Indium-Thallium Alloys at Low Temperatures. Ronald J. Sladek. *Physical Review,* v. 97, ser. 2, Feb. 15, 1955, p. 902-915.

Measurements made on alloys containing up to 50 at. % of thallium. Tables, diagram, graphs. 51 ref. (P11, In, Tl)

139-P. Review of Experimental Investigations of Liquid-Metal Heat Transfer. Bernard Lubarsky and Samuel J. Kaufman. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3336, Mar. 1955, 115 p.

Theoretical analysis of published experimental data. Considerable spread observed between experimental results and predictions of theoretical calculations. Graphs, tables. 41 ref. (P12)

140-P. Gases in Metals. P. Bardenheuer. *Henry Brutcher Translation No.* 3440, 15 p. (From *Metall,* v. 6, nos. 13-14, 1952, p. 351-356.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 454-P, 1952. (P12, E25)

141-P. (French.) **Relation Between the Temperature of a Ferromagnetic Substance and the Heat Dissipated Internally by an Alternating Field.** Gustave Ribaud and Denise Bordier. *Comptes rendus,* v. 240, no. 7, Feb. 14, 1955, p. 703-707.

A ferromagnetic substance placed in a high frequency alternating field is heated by Foucault currents and hysteresis, and heat dissipation studied as a function of temperature. Graphs. 2 ref. (P16, Fe)

142-P. (French.) **Determination of the Activities of Copper and Gold in Their Alloys.** Daniel Balesdent. *Comptes rendus,* v. 240, no. 7, Feb. 14, 1955, p. 760-762.

Study of the reduction equilibrium of copper sulfide by hydrogen in the presence of gold. Table. 6 ref. (P12, Cu, Au)

143-P. (German.) **Electron Emission of Metal Surfaces After Mechanical Working.** J. Lohff and H. Raether. *Naturwissenschaften,* v. 42, no. 3, Feb. 1955, p. 66-67.

Relationship of magnitude of electron emission to position of the metals in the periodic system. Table, graph. 5 ref. (P15)

144-P. The Electrical Resistance of Dilute Copper Alloys at Very Low Temperatures. Guy K. White. *Canadian Journal of Physics,* v. 33, Mar.-Apr. 1955, p. 119-124.

Description af adiabatic demagnetization cryostat. Measurements near 1° K. Diagram, graph. 12 ref. (P15, Cu)

145-P. Electrical Conduction in Molten Cu-Fe Sulphide Mattes. G. M. Pound, G. Derge and G. Osuch. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Mar. 1955, p. 481-484.

Investigation of mode of electrical conduction as an aid in structure determinations. Diagrams, tables, graph, circuit diagram. 16 ref. (P15, M25, Cu)

146-P. Activities in the Iron Oxide-Silica-Lime System. John F. Elliott. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Mar. 1955, p. 485-488.

Thermodynamic studies of behavior of phases in molten slag system. Graphs. 15 ref. (P12, B21, ST)

147-P. The Temperature Dependence of Magnetostriction in a Nickel Crystal. W. D. Corner and G. H. Hunt. *Physical Society, Proceedings,* v. 68, no. 423A, Mar. 1955, p. 133-144.

Measurements of longitudinal magnetostriction of specimens over the temperature range −180 to 360° C. Diagrams, tables, graphs. 18 ref. (P16, Ni)

148-P. Apparatus for Measuring the Thermal Conductivity of Metals in Vacuum at High Temperatures. Marvin Moss. *Review of Scientific Instruments,* v. 26, Mar. 1955, p. 276-280.

Equipment measures both axial temperature gradient and transfer of heat under steady state conditions in a thermally shielded cylindrical rod of the metal which is heated at one end and cooled at the other. Diagram, table, graphs. 2 ref. (P11)

149-P. (Book.) **Modern Aspects of Electrochemistry.** J. O'M. Bockris. 344 p. 1954. Academic Press Inc., 125 East 23rd. St., New York 10, N. Y. $6.80.

Recent theoretical and practical developments in our understanding of electrochemical problems. (P15)

150-P. Total Normal Emissivity Measurements on Aircraft Materials

Between 100 and 800° F. N. W. Snyder, J. T. Gier and R. V. Dunkle. *American Society of Mechanical Engineers, Paper No.* 54—A-189, 1954, 14 p. + 3 plates.

Results of techniques developed and used to determine mean effective emissivity of different surfaces from 100 to 800° F. Diagrams, graphs. 7 ref. (P11)

151-P. **Electrical Contact Materials.** John D. Kleis. *Electrical Manufacturing,* v. 55, Apr. 1955, p. 102-107.

Mechanical and electrical properties of over 30 metals, alloys and oxides related to performance. Tables, photographs.
(P15, Q general, T1, SG-r)

152-P. **The Thermal Conductivity of Metals at Low Temperatures.** H. M. Rosenberg. *Royal Society of London, Philosophical Transactions,* v. 247, ser. A, no. 933, Mar. 1955, p. 441-497.

Thermal conductivity of high-purity samples of 32 metals. Tables, diagrams, graphs. 58 ref. (P11)

153-P. (French.) **Discontinuities in the Thermo-Electric Properties of Thin Metallic Sheets.** Jean Savornin and France Savornin. *Comptes rendus,* v. 240, no. 8, Feb. 21, 1955, p. 850-852.

Thermo-electric power data of layers of aluminum, vaporized in a vacuum, followed by exposure to air. Graph. 1 ref. (P15, Al)

154-P. (French.) **Electromotive Force and Thermo-Electric Power of the Aluminum-Silver Couple.** André Aron. *Comptes rendus,* v. 240, no. 8, Feb. 21, 1955, p. 852-854.

Prepared by vaporization, in vacuo, of pure silver and pure aluminum, in relatively thick deposits, with an electric resistance near 1 Ω. Graph. 4 ref. (P15, Ag, Al)

155-P. (Russian.) **Influence of the Holes (Vacancies) in the Crystal Lattice on the Electrical Resistance of a Metal.** B. G. Lazarev and O. N. Ovcharenko. *Doklady Akademii Nauk SSSR,* v. 100, no. 5, Feb. 11, 1955, p. 875-878.

Mathematical treatment. Increase of residual resistance with increase of heating temperature before quenching. Graphs. 11 ref.
(P15, Au, Pt)

156-P. **The Vapor Pressure of Americium Metal.** Stephen C. Carniglia and B. B. Cunningham. *American Chemical Society, Journal,* v. 77, Mar. 20, 1955, p. 1502.

Determined between 1103 and 1453° C. 5 ref. (P12, Am)

157-P. **Electrical Properties of Gallium Antimonide.** D. P. Detwiler. *Physical Review,* v. 97, ser. 2, Mar. 15, 1955, p. 1575-1578.

Data on conductivity and Hall coefficient of several samples. Graphs. 7 ref. (P15, Ga, Sb)

158-P. **Superconductivity of Uranium.** John L. Kilpatrick, Edward F. Hammel and Dillon Mapother. *Physical Review,* v. 97, ser. 2, Mar. 15, 1955, p. 1634-1635.

Various samples of uranium become superconductors at various temperatures; reasons for this behavior are still somewhat obscure. 4 ref. (P15, U)

159-P. **Preliminary Experiments on the Temperature-Wave Method of Measuring Specific Heats of Metals at Low Temperatures.** D. H. Howling, E. Mendoza and J. E. Zimmerman. *Royal Society, Proceedings,* v. 229, ser. A, Apr. 5, 1955, p. 86-109.

Reliable results can be obtained in the helium range, using apparatus and procedures which are not too complicated. It seems reasonable that the method will still be useful at temperatures below 1°K. Diagrams, graphs. 17 ref. (P12)

160-P. (German.) **Electric Conductivity of Cadmium Selenide.** K. Hauffe and H. G. Flint. *Annalen der Physik,* v. 15, nos. 3-4, 1955, p. 141-147.

Measurements between 300 and 500° C. Diagrams, tables. 12 ref.
(P15, Cd, Se)

161-P. (German.) **Determining the Melting Range of Several Commercial Ferro-Alloys.** Hans. Brendecke and Franz Pawlek. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 125-126.

Melting temperature determinations on eight types. Table, diagram. 3 ref. (P12, Fe-n)

162-P. (German.) **Ferromagnetic Properties of Transition Metal Alloys With Elements of the B-Group.** Lotte Castelliz. *Zeitschrift für Metallkunde,* v. 46, no. 3, Mar. 1955, p. 198-203.

Investigation of binary and ternary systems. Relation between crystal structure and ferromagnetic properties. Tables, diagrams. 12 ref.
(P16, M24)

163-P. (Russian.) **Electrode Potentials of Metals in Fused Salts.** Iu. K. Delimarskii. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 1, Jan. 1955, p. 28-38.

Decomposition potentials at 700° C.; electrochemical charges; anion effects. Tables. 40 ref. (P15)

164-P. (Russian.) **Thermo-Electric Properties of Alloys of the Bismuth-**

Tellurium System. F. I. Vasenin. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 3, Mar. 1955, p. 397-401.

Data on properties of cast, pressed and tempered specimens. Table, graphs. 4 ref. (P15, Bi, Te)

165-P. Specific-Heat Measurements on Aluminium-4% Copper and Aluminium-4% Copper-Tin Alloys. I. J. Polmear and H. K. Hardy. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 393-394.

Measurements of instantaneous apparent specific heat of aluminum-copper and aluminum-copper-tin alloys, on heating, showed a heat evolution due to precipitation which, on further raising the temperature, was replaced by a heat absorption due to re-solution. Graphs. 7 ref. (P12, Al)

166-P. Thermoelectric Power and Electrical Resistivity of Dilute Alloys of Silicon in Copper, Nickel, and Iron. C. A. Domenicali and F. A. Otter. *Journal of Applied Physics,* v. 26, Apr. 1955, p. 377-380.

Determines effects on thermopower of the neighboring elements, iron, nickel and copper, when varying amounts of the same foreign atom are dissolved in them. Graphs. 11 ref. (P15, Si, Cu, Ni, Fe)

167-P. Orientation and Temperature Effects on the Electrical Resistivity of High-Purity Magnesium. James L. Nichols. *Journal of Applied Physics,* v. 26, Apr. 1955, p. 470-472.

Additional insight into electrical resistivity in terms of improvement of metal purity and verification of existing data on the effect of crystal orientation and temperature on electrical properties of magnesium. Graphs, tables. 6 ref. (P15, Mg)

168-P. Study of the Radiation Stability of Austenitic Type 347 Stainless Steel. M. B. Reynolds, J. R. Low, Jr., and L. O. Sullivan. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Apr. 1955, p. 555-559.

Effect of neutron bombardment on the stability of Type 347 investigated by a magnetic technique. Graphs, diagram, table. 3 ref. (P10, SS)

169-P. A Thermodynamic Study of Liquid Metallic Solutions. VI. Calorimetric Investigation of the Systems Bismuth-Lead, Cadmium-Lead, Cadmium-Tin and Tin-Zinc. O. J. Kleppa. *Journal of Physical Chemistry,* v. 59, Apr. 1955, p. 354-361.

High-temperature calorimeter determines heats of mixing for the systems. Tables, graphs. 12 ref. (P12, Bi, Cd, Pb, Sn, Zn)

170-P. (English.) **Some Investigation on the Electrical Properties of Hexagonal Selenium.** L. M. Nijland. *Philips Research Reports,* v. 9, Aug. 1954, p. 259-294.

Effects of small amounts of impurities, such as halogens or thallium, on semiconducting properties. Graphs, diagrams, table, micrograph. 37 ref. (P15, Se)

171-P. (English.) **Magnetic Hysteresis in Annealed Nickel-Cobalt Alloys.** Mikio Yamamoto, Satoshi Taniguchi and Kinji Hoshi. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 539-550.

Abnormal hysteresis loops may be explained by the occurrence of an additional uni-axial anisotropy along the direction of magnetization vectors during annealing. Table, graphs. 20 ref. (P16, Ni, Co)

172-P. (English.) **Influence of Addition of Nickel on the Thermal Expansion, Rigidity Modulus and Its Temperature Coefficient of the Alloys of Cobalt, Iron and Chromium, Especially of Co-Elinvar. I. Additions of 10 and 20 Per Cent of Nickel.** Hakaru Masumoto, Hideo Saito and Tatsuo Kono. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 529-538.

Results of study on the influence of addition of nickel on the physical properties of the alloys of cobalt, iron and chromium. Tables, graphs. 5 ref. (P11, Q21, Co, Fe, Cr, NiO)

173-P. Thermal Conductivity and Its Variability With Temperature and Pressure. Leon S. Kowalczyk. *American Society of Mechanical Engineers, Paper No.* 54—A-90, 1955, 33 p.

Present status of theory of thermal conductivity and attempts to explain its variability with temperature and pressure by means of the nature of heat, structure of matter and resistances offered by matter to heat conduction at various physical states. Tables, graphs. (P11)

174-P. Viscous Flow of Copper at High Temperatures. A. L. Pranatis and G. M. Pound. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 664-668.

Copper foils, of varying thickness and grain size, measured under such conditions of low stress and high temperature; it is believed that creep was predominately the result of interboundary diffusion. Tables, diagram, graphs. 26 ref. (P10, N1, Q3, Cu)

175-P. Curie Temperatures of Binary and Ternary Sigma Phases. M. V.

Nevitt and P. A. Beck. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 669-674.

Correlation of Curie temperature with composition may be described qualitatively in terms of contributions of the various component, atomic moments to the saturation moment of the alloy. Tables, diagram, graphs. 20 ref. (P16)

176-P. Radiolytic-Gas Bubbling Improves Convective Heat Transfer in Supo. Franklin P. Durham. *Nucleonics,* v. 13, May 1955, p. 42-46.

Experimental heat-transfer data and order-of-magnitude analyses of the effect on heat-transfer coefficient of fluid agitation caused by bubble evolution. Photograph, graphs, table. 8 ref. (P12)

177-P. Oscillatory Thermomagnetic Properties of a Bismuth Single Crystal at Liquid Helium Temperatures. M. C. Steele and J. Babiskin. *Physical Review,* v. 98, ser. 2, Apr. 15, 1955, p. 359-367.

Attempts to correlate thermo-electric power and thermol conductivity of bismuth, with its susceptibility, magnetoresistance and Hall coefficient on exhibiting the same type of magneto-oscillatory behavior. Tables, graphs. 23 ref. (P16, P11, Bi)

178-P. (German.) **Aluminum as a Conducting Material.** E. Nachtigall. *Elektrotechnik und Maschinenbau,* v. 72, no. 5, Mar. 1, 1955, p. 99-105.

Electric characteristics; influence of impurities; fields of application. Tables, diagrams. 8 ref. (P11, T1, Al)

179-P. (Russian.) **Problem of Temperature Dependence of Surface Tension of Metals.** S. N. Zadumkin. *Doklady Akademii Nauk SSSR,* v. 101, no. 3, Mar. 21, 1955, p. 507-509.

Mathematical treatment. Table. 19 ref. (P12)

180-P. (Russian.) **Determination of the Activity of Iron Oxide in Molten Slags by the Method of Electromotive Forces.** O. A. Esin, B. M. Lepinskikh and V. I. Musikhin. *Izvestiia Akademii Nauk SSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 12, Dec., p. 120-127.

Thermodynamic properties of CaO-FeO-SiO_2 melts. Method avoids laborious chemical analysis. Change of isobar potential. Phase diagram, tables, graphs. 13 ref. (P12, ST)

181-P. (Russian.) **The Goldhammer Effect in Alloys of a Ternary System of Iron, Nickel, and Cobalt.** N. V. Grum-Grzhimailo. *Izvestiia Akademii Nauk SSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 12, Dec., p. 137-139.

Relation of relative variations of electric resistance, under the influence of a longitudinal magnetic field, to the electronic states of the outer orbits. Table, phase digram. 5 ref. (P15, Fe, Ni, Co)

182-P. (Russian.) **Investigation of the Resistance to Growth of Magnesium Cast Iron.** A. D. Ushakov. *Liteinoe Proizvodstvo,* 1955, no. 4, Apr., p. 22-23.

Dilatometric study of volume changes. Micrographs, graphs, table. (P10, CI)

183-P. (Russian.) **Investigation of the Thermoelectrical Properties of Bismuth Telluride.** R. M. Vlasova and L. S. Stil'bans. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 569-576.

Effect of temperature on conductivity and Hall effect of electronic and vacancy types. Analysis of test methods. Circuit diagrams, graphs, table, diagrams. 5 ref. (P15, Bi, Te)

184-P. (Russian.) **Nernst-Ettingshausen Thermomagnetic Effect in Tellurium.** A. Z. Daibov and I. M. Tsidil'kovskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 742-746.

Relation to temperature and to concentrations of electrons and holes. Equations. Graphs. 4 ref. (P16, Te)

185-P. (Russian.) **Effect of Impurities on the Mechanism of the Electroconductivity of Aluminum Antimony.** A. R. Regel' and M. S. Sominskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 768-770.

Effect of atoms of tin, lead, arsenic, bismuth, selenium and tellurium on rectifying properties. Table, graph. 10 ref. (P15, Al, Sb)

186-P. Lithium: Heat Content From 0 to 900°, Triple Point and Heat of Fusion, and Thermodynamic Properties of the Solid and Liquid. Thomas B. Douglas, Leo F. Epstein, James L. Dever and William H. Howland. *American Chemical Society, Journal,* v. 77, Apr. 20, 1955, p. 2144-2150.

Vacuum distilled lithium is studied from 298.16 to 1200° K. Tables, graphs, diagram. 41 ref. (P12, Li)

187-P. Heat Treatment Practice in Relation to the Dimensional Stability of Steel. N. J. Sheppard. *Australasian Engineer,* 1955, Mar., p. 46-56.

Factors affecting dimensional stability in case-hardening, gaseous ni-

triding and induction hardening processes. Photograph, graphs, diagrams, tables. 48 ref. (P10, J28, J2, ST)

188-P. Effect of Low Temperature on the Stability of Permanent Magnets. A. G. Clegg. *British Journal of Applied Physics,* v. 6, Apr. 1955, p. 120-123.

Magnetometer measurements made of the change in magnetization with temperature between +60 and −60° C. on Alcomax III, Columax, Alnico and 35 and 15% cobalt steels. Graphs, tables. 3 ref. (P16, SG-n)

189-P. The Resistivity of Thin Metallic Films. D. E. Clark. *British Journal of Applied Physics,* v. 6, May 1955, p. 158-160.

Comparison of the resistivities of antimony and bismuth films at microwave frequencies with the values measured by direct current. Tables, diagram, graphs. 4 ref. (P15, Sb, Bi)

190-P. The Use of Free Energy Maps in Extractive Metallurgy. S. N. Anant Narayan. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 105-121; disc., p. 121-122.

Principles and applications of the diagrams of standard free energies of formation of metallic compounds. Graphs. 20 ref. (P12, C general)

191-P. Impact of Magnetism Upon Metallurgy. C. Zener. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 619-630.

Influence of the magnetic properties of the constituent atoms upon the various properties of metals and alloys. Tables, graphs, diagrams. 49 ref. (P16)

192-P. A Vapor Pressure Chart for Metals. R. L. Loftness. *U. S. Atomic Energy Commission,* NAA-SR-132, 1952, 9 p.

Although the observed vapor pressure data for a few metals do not fit exactly the values predicted, there is a close enough correlation for most metals to give the chart some utility in estimating vapor pressures of metals. Tables, chart. 4 ref. (P12)

193-P. Effect of Pressure on Thermal Conductance of Contact Joints. Martin E. Barzelay, Kin Nee Tong and George F. Holloway. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3295, May 1955, 52 p.

Tests conducted to determine factors influencing thermal conductance across interface formed between stationary plane surfaces of 75S-T6 aluminum-alloy and AISI Type 416 stainless steel blocks. Graphs, diagrams, tables. 2 ref. (P11, Al, SS)

194-P. Use of the Instron Tensile Testing Machine to Observe Resistance Recovery. Herman M. Dieckamp and Charles J. Meechan. *U. S. Nuclear Engineering and Manufacturing, NAA-SR-MEMO*-1107, 1955, 17 p.

Observation of resistivity recovery in cold worked and irradiated metals. Diagrams, graph. (P15, Q27)

195-P. On the Recovery of Electrical Resistance of Cold-Worked Gold. Charles J. Meechan and Herman M. Dieckamp. *U. S. Nuclear Engineering and Manufacturing, NAA-SR*-1159, 1955, 17 p.

Recovery performance in the temperature range 100 to 200° C. and the determination of the activation energy associated with the process. Graphs, diagram, tables. 9 ref. (P15, Au)

196-P. (German.) **Electric Resistance and Plastic Deformation of Metals.** Hendrik Gerard van Bureren. *Zeitschrift für Metallkunde,* v. 46, no. 4, Apr. 1955, p. 272-282.

Relation between resistance and lattice defects; experimental data compared with theory; effect of heat treatment. Tables, graphs. 53 ref. (P15, Q24)

197-P. Magnetic Susceptibility Measurements of Germanium Between Room Temperature and Liquid Hydrogen Temperatures. A. van Itterbeek, L. de Greve and W. Duchateau. *Applied Scientific Research,* v. 4, sec. B, no. 4, 1955, p. 300-308.

Experimental method and apparatus; description of samples. Diagrams, graphs, table. 3 ref. (P16, Ge)

198-P. Alloy Improves Magnetic Recording. Carroll W. Lufcy and Wesley T. Heath. *Electronics,* v. 28, June 1955, p. 137-139.

Recording and reproducing heads using the new Alfenol have advantages of wear resistance, increase in resolution, decrease in core losses. Tables, photograph, graphs. 5 ref. (P16, T1, Al, Fe)

199-P. Rate of Heat Absorption of Steel. Fred S. Bloom. *Iron and Steel Engineer,* v. 32, May 1955, p. 64-74; disc., p. 74-76.

By combining time lag and Stefan-Boltzmann's law, a practical and

simplified method is developed for calculating the rate of heat absorption and time-temperature relation. Tables, graphs, diagram. (P12, ST)

200-P. The Magnetic Moments of Cobalt-Copper Alloys. J. Crangle. *Philosophical Magazine,* v. 46, 7th ser., no. 376, May 1955, p. 499-513.

Rate of change of atomic moment with electron concentration for the high-temperature face-centered cubic form of the solid solution of copper in cobalt derived from measurements on the variation of spontaneous magnetization of suitable alloys with temperature. Graphs, tables. 13 ref. (P16, Co, Cu)

201-P. A Study of the Thermal Diffusion Equation With Boundary Conditions Corresponding to Solidification or Melting of Materials Initially at the Fusion Temperature. F. Kreith and F. E. Romie. *Physical Society, Proceedings,* v. 68, no. 425B, May 1955, p. 277-291.

Two analytical solutions to problems for which the nonlinearity is present. Diagrams, tables, graphs. 7 ref. (P11, N12)

202-P. Electrochemical Studies of Non-Aqueous Melts. R. F. Mehl and G. Derge. *U. S. Atomic Energy Commission, NYO*-6618, May 1955, 6 p.

Conductivity of sulfides; self-diffusion of iron in molten carbon-saturated iron; electrolysis of molten MnO-FeO-SiO_2 slags. Tables. (P15, N1, B21, Fe)

203-P. (English.) **The Role of Crystal Structure in Irradiation Effects in Metals.** D. Wruck and C. Wert. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 115-120.

Report on series of measurements made on iron, cobalt and nickel. Diagrams, tables, graphs. 3 ref. (P10, M26, Fe, Co, Ni)

204-P. (English.) **Calorimetric Measurements During Precipitation in a Gold-Nickel Alloy.** J. Nyström. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 182-185.

Heat of precipitation in an alloy in the gold-nickel system measured and compared with calculated values obtained from the heat of mixing; kinetics of the transformation studied. Diagram, graphs. 14 ref. (P12, Au, Ni)

205-P. (Russian.) **Oxidation of Phosphorus Dissolved in Liquid Iron and the Effect of Phosphorus on the Solubility of Oxygen.** N. P. Levenets and A. M. Samarin. *Doklady Akademii Nauk SSSR,* v. 101, no. 6, Apr. 21, 1955. p. 1089-1092.

Reaction equations. Variation of activity of the oxygen and phosphorus explained by the formation of triphosphate of iron and other compounds of phosphorus with iron. Graphs. 2 ref. (P12, Fe)

206-P. (Russian.) **Optical Properties of Metals.** V. L. Ginzburg and G. P. Motulevich. *Uspekhi Fizicheskikh Nauk,* v. 55, no. 4, Apr. 1955, p. 469-535.

Reflection from metal surfaces; surface impedance and dielectric properties. Graphs, diagrams, tables. 64 ref. (P17, Cu, Ag, Au, Sn, Al)

207-P. Ferromagnetic Domain Patterns on Single Crystals and Bicrystals of Nickel. Ursula M. Martius and K. V. Gow. *Canadian Journal of Physics,* v. 33, May 1955, p. 225-234.

Investigation of the effect of crystal boundaries on domain structure. Diagram, table, micrographs. 13 ref. (P16, Ni)

208-P. Reaction of Nitrogen With Uranium. M. W. Mallett and A. F. Gerds. *Electrochemical Society, Journal,* v. 102, June 1955, p. 292-296.

Rates of reaction determined by volumetric measurements in the temperature range 550 to 900° C. at atmospheric pressure. Reactions found to follow a parabolic rate law with some deviations initially and also after the period of parabolic reaction. Micrographs, graphs, table. 4 ref. (P13, U)

209-P. Kinetics of Surface Reactions of Metals. I. Iron. Donald M. Sowards and Norman Hackerman. *Electrochemical Society, Journal,* v. 102, June 1955, p. 297-303.

Reaction of iron with dilute, aqueous acetic acid studied in a closed system with a nitrogen atmosphere at 34° C. Extent of reaction, determined gravimetrically, found to be directly proportional to exposure time. Diagrams, graphs, tables. 24 ref. (P13, R6, Fe)

210-P. Low-Expansion Cast Iron. Harold Brown. *Machine Design,* v. 27, June 1955, p. 175-177.

Properties and design characteristics of a nickel cast iron capable of holding precision dimensions under local heating conditions. Photograph, graph, micrograph, table. (P11, CI)

211-P. Electrical Resistance of Copper-Gold Alloys at Low Temperatures. Elio Passaglia and William F. Love. *Physical Review,* v. 98, ser. 2, May 15, 1955, p. 1006-1010.

Electrical resistance of a series of

five alloys in quenched and annealed states studied from room temperature to about 2° K. Composition of the alloys was 25, 37.5, 50, 62.5 and 75 At.% gold. Graphs, tables. 7 ref. (P15, Cu, Au)

212-P. Hysteresis of the Angle of Contact of Mercury Against Steel. D. J. Wright. *Physical Society, Proceedings,* v. 68, no. 425B, May 1955, p. 297-303.

Problems undertaken to investigate how the hysteresis of the angle of contact varied with adsorption from the atmosphere in which the solid was placed, and to attempt some qualitative experiments on the effects of roughness. Diagram, graph, tables. 16 ref. (P13, ST, Hg)

213-P. Electron Emission and Other Phenomena on Freshly Disturbed Surfaces. L. Grunberg. *Research,* v. 8, June 1955, p. 210-214.

Measurement of small electron currents from deformed surfaces. Study of abraded surfaces by their images on photographic plates. Diagrams. 13 ref. (P15, S15)

214-P. The Thermal Conductivity of Tin at Low Temperatures. S. J. Laredo. *Royal Society, Proceedings,* v. 229, ser. A. May 24, 1955, p. 473-492.

The use of subsidiary thermometers has improved the technique of measurement below 1° K. and enabled conductivities to be measured more accurately. Diagram, tables, graphs. 31 ref. (P11, Sn)

215-P. Non-Magnetic Ferrous and Magnetic-Compensating Alloys. C. Gordon Smith. Paper from "Magnetic Alloys and Ferrites". George Newnes Ltd., p. 171-178.

Properties and application of nonmagnetic steels, cast irons, and magnetic compensating alloys. Graphs, tables. 9 ref. (P16, T1, ST, CI)

216-P. Soft Magnetic Materials. W. S. Melville. Paper from "Magnetic Alloys and Ferrites". George Newnes Ltd., p. 37-84.

Important characteristics and factors affecting their properties in limiting commercial applications. Tables, graphs, diagrams. 24 ref. (P16, T general, SG-p)

217-P. (English.) **Theoretical Study of Residual Resistance of Binary Alloys Containing Foreign Atoms in Small Concentration.** Hiroshi Fujiwara. *Physical Society of Japan, Journal,* v. 10, no. 5, May 1955, p. 339-346.

A modified, screened Coulomb field is exactly obtained from the Thomas-Fermi equation by numerical integration. For the calculation of the cross section, the method of partial wave was used. Graphs, tables. 7 ref. (P15)

218-P. (English.) **Magnetic Properties of FeTe.** Enji Uchida and Hisamoto Kondoh. *Physical Society of Japan, Journal,* v. 10, no. 5, May 1955, p. 357-362.

Susceptibility-temperature relation for the compound FeTe measured over a range of temperatures between liquid air and 1150° C. Graphs, table. 13 ref. (P16, Fe, Te)

219-P. (German.) **Measuring the Direct-Current Magnetization Curve and Hysteresis Curve.** Hans Neumann. *Archiv für technisches Messen,* 1955, no. 232, May, p. 105-108.

Practical suggestions on the determination of magnetic properties. Graphs. 14 ref. (P16)

220-P. (Italian.) **Influence of Chromium and Manganese Impurities on Electric Properties of Aluminum.** T. Federighi. *Alluminio,* v. 24, no. 2, Mar. 1955, p. 129-133.

Effect of small chromium and manganese contents on commercial aluminum in electrical applications. Graphs, tables. 3 ref. (P15, Al)

221-P. (Russian.) **Effect of Order or Disorder on the Hall Effect in Ferromagnetic Alloys.** N. S. Akulov and A. V. Cheremushkina. *Doklady Akademii Nauk SSSR,* v. 102, no. 1, May 1, 1955, p. 45-47.

General formula permits a quantitative determination of Hall's constant with respect to the resistivity of the alloy in relation to temperature and to the degree of order. Graphs. 9 ref. (P15, SG-p)

222-P. (Russian.) **Interrelationship Between Composition, Temperature, and Heat Resistance. II. Alloys of a Ternary System of Nickel-Chromium-Titanium.** I. I. Kornilov and V. V. Kosmodem'ianskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 90-97.

Optimum compositions of the most heat resistant alloys determined for several ranges of temperatures. Problem of degree of homogeneity of structure. Graphs. 8 ref. (P12, Ni, SG-h)

223-P. (Russian.) **Heat Content and Mechanical Properties of Metals.** K. A. Osipov and S. G. Fedotov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 98-104.

Relation of heat content of liquid metals at the melting point to the strength, hardness and plastic properties of the solidified metals. Graphs, tables. 30 ref. (P12, Q general)

224-P. (Russian.) **Some Problems of a Slag Theory.** I. S. Kulikov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 113-121.

Activity of iron oxide in the system FeO-SiO_2 at temperatures from 1178 to 3000° C. Concentration dependence of partial heats and entropies of solution. Graphs, table. 9 ref. (P12, B21, Fe)

225-P. Energy Relations in Cold Working an Alloy at 78° K. and at Room Temperature. J. S. L. Leach, E. G. Loewen and M. B. Bever. *Journal of Applied Physics,* v. 26, June 1955, p. 728-731.

Energy relataions associated with plastic deformation by cold working of a 75% gold-25% silver alloy at two temperatures. The energy stored in the chips was measured by tin solution calorimetry and the total energy expended in the deformation was determined from dynamometer measurements. Diagrams, tables, graph. 10 ref. (P12, Q24, Au, Ag)

226-P. Work Function of Tungsten Single Crystal Planes Measured by the Field Emission Microscope. Erwin W. Müller. *Journal of Applied Physics,* v. 26, June 1955, p. 732-737.

Method combines the field emission microscope with a probe collector. The current density in the (011) plane turned out to be 4 to 5 orders of magnitude smaller than in strongly emitting planes. Diagrams, graphs, table, photograph. 21 ref. (P15, M26, W)

227-P. Heat Transfer Experiments With Sodium and Sodium Potassium Alloy. W. B. Hall and A. E. Jenkins. *Journal of Nuclear Energy,* v. 1, June 1955, p. 244-263.

Theoretical approach to the problem of heat transfer in liquid metals. Description of experiments in which the heat transfer coefficients between two annuli, each carrying a flow of liquid metal, were measured. Graphs, diagrams, table. (P11, Na, K)

228-P. Atomic Radiations Change Materials. C. Mannal, C. A. Bruch and R. F. Koenig. *Power,* v. 99, July 1955, p. 94 + 6 pages.

Design engineers planning nuclear reactors must deal with radiations as an additional factor to the more usual weight, strength, hardness, thermal conductivity and electrical resistivity considered in many machinery arrangements. Photographs, graphs, table, diagrams, micrographs. 5 ref. (P10)

229-P. Measurement of Resistance and Reactance of Expanded ACSR. Joel Tompkins, B. L. Jones and P. D. Tuttle. *Power Apparatus and Systems,* 1955, no. 18, June, p. 368-373; disc., p. 373-375.

Electrical characteristics, reactance and effective resistance at the frequency of 60 c.p.s., of steel reinforced aluminum cable. Tables, graphs, photographs, diagrams. 5 ref. (P15, Al, ST)

230-P. Vapor Pressure Curves for C, Ni, Fe, Cr, Mo, W, Cu, Ta, and Al Over the Pressure Range From 10^{-10} Atm. to 1 Atm. A. R. Smider. *U. S. Atomic Energy Commission,* CRD-T2B-171, 1952, 12 p.

Pressure range covered herein is considered to be adequate for all ordinary applications. Tables, graphs. (P12)

231-P. Thermal Conductivity of Metal Composites. E. B. Masters. *U. S. Atomic Energy Commission,* APEX-186, 1954, 4 p.

Results of tests performed to evaluate the thermal insulating properties of metal composites. Comparison of thermal conductivities of the metal composite tested and "Thermoflex" mineral wool insulation at various temperatures. Graph, diagrams. (P11)

232-P. (English.) **Investigation on the Electrical Resistance Alloys of Copper Manganese and Tin.** Hideo Nishimura and Masao Adachi. *Kyoto University, Engineering Research Institute Technical Reports,* v. 4, no. 3, Sept. 1954, p. 37-72.

Investigation of the electrical properties of the ternary copper alloys, containing 2-18% manganese and 4-10% tin, revealed that annealing at low temperature decreases the electrical resistance and increases the temperature coefficient of cold drawn specimens. Tables, diagrams, graphs, micrographs. 59 ref. (P15, SG-q, Cu)

233-P. (German.) **Thermodynamic Analysis. II. The Heat-Content Curve of a Substance From a Single Calorimetric Experiment.** Willy Oelsen, Karl Heinz Rieskamp and Olaf Oelsen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 253-266.

New simple calorimetric method for measuring heat contents of substances, especially of metals, over wide temperature ranges. Diagrams, graphs, table. 31 ref. (P12)

234-P. (Polish.) **Activity Coefficients of Metals in Liquid Ternary Solutions.** Wadysaw Ptak. *Archiwum Gornic-*

twa i Hutnictwa, v. 3, no. 1, 1955, p. 69-87.

Formulas for several ternary liquid solutions, effect of temperature and composition on activity coefficients. Tables, phase diagrams. 3 ref. (P12, Pb, Cd, Zn, Sn, Bi)

235-P. (Book.) **Magnetic Alloys and Ferrites.** M. G. Say, editor. Electrical Engineering Progress Series. 200 p. 1954. George Newnes Limited, Tower House, Southampton Street, Strand, W. C. 2, London, England. $2.94.

Eight papers which present an account of modern views on the fundamental processes of magnetization, including the domain theory. Pertinent papers are individually abstracted. (P16, SG-n, SG-p)

236-P. Liquid Surface Tension Measurements by Analysis of Solid-State Curvatures; Surface Tension of Liquid Germanium. R. C. Sangster and J. N. Carman, Jr. *Journal of Chemical Physics,* v. 23, June 1955, p. 1142-1145.

Procedure, based on zone-melting techniques, developed for determining liquid-gas surface tension coefficients; germanium at its melting point, in contact with helium or nitrogen, has a surface tension of 632.5 dynes per cm. Graphs, diagrams, photograph. 9 ref. (P10, Ge)

237-P. Some Magnetic Properties of Dilute Ferromagnetic Alloys. I. G. Bate, D. Schofield and W. Sucksmith. *Philosophical Magazine,* v. 46, 7th ser., no. 377, June 1955, p. 621-631.

Investigation into the variation with heat treatment of the magnetic properties of copper-cobalt and copper-iron containing small percentages of ferromagnetic component. Table, graphs, diagrams. 14 ref. (P16, J general, Cu)

238-P. The Influence of Temperature on Magnetic Viscosity. J. H. Phillips, J. C. Woolley and R. Street. *Physical Society, Proceedings,* v. 68, no. 426B, June 1955, p. 345-352.

Measurements made to demonstrate the effect of temperature on irreversible magnetic viscosity in different types of precipitation alloys—Pt-Co, Ni_3Au and Alnico in an undeveloped state. Graphs. 12 ref. (P16, SG-p)

239-P. The Role of Crystal Structure on Irradiation Effects on Metals. D. Wruck and C. Wert. *U. S. Atomic Energy Commission, AECU*-2906, Apr. 1955, 24 p.

The resistivity of iron increases more than that of cobalt and nickel when these metals are bombarded at −150° C. by 12 m.e.v. deuterons. The same effect was observed for iron and nickel by neutron irradiation at room temperature. Graphs, diagram, table. 3 ref. (P15, Co, Fe, Ni)

240-P. Study of Metal-Ceramic Interactions at Elevated Temperatures. F. H. Norton and W. D. Kingery. *U. S. Atomic Energy Commission, NYO*-4630, Apr. 1, 1955, 15 p.

Measurements of surface tension and contact angles of nickel-chromium and nickel-titanium alloys indicate that chromium and titanium are adsorbed at the interface much the same way as silicon from iron-silicon alloys. The adsorption of titanium is appreciable at concentrations of 0.1 % and alloys containing surface-active materials are shown to wet oxides. Diagrams, graphs. (P13, H general)

241-P. Flammability of Sodium Alloys at High Temperatures. G. P. Smith, M. E. Steidlitz and L. L. Hall. *U. S. Atomic Energy Commission* ORNL-1799, July 8, 1955, 4 p.

Data on flammability in air jets of sodium alloys at temperatures from 600 to 800° C. Examines sodium alloys containing mercury or bismuth which are nonflammable over certain ranges of composition and temperature. Graphs, diagram. 1 ref. (P12, Na)

242-P. (French.) **Thermal Conductivity of Nickel Below and Above the Curie Point.** Lionel Hugon and Jean Jaffray. *Annales de physique,* v. 10, ser. 12, June 1955, p. 377-385.

Study of thermal conductivity of nickel from ordinary temperature to 650° C., and behavior as it crosses the Curie point. Diagram, tables, graphs. 11 ref. (P11, Ni)

243-P. (French.) **Experimental Results and Attempts to Interpret the Scintillation Effect of Granular Metallic Layers.** Nicolas Nifontoff. *Comptes rendus,* v. 240, no. 22, June 1, 1955, p. 2128-2130.

Compares variations of resistance and scintillation effects of thin layers of silver as a function of the intensity of the d.c. that passes through them and an interpretation of these phenomena. Graphs. 5 ref. (P15, Ag)

244-P. (French.) **Effects of Elastic Deformations on Superconductivity. I. Case of Tin.** Claude Grenier. *Comptes rendus,* v. 240, no. 24, June 13, 1955, p. 2302-2304.

The variation ΔH_c of the critical

field, under the effect of elastic deformations, studied as a function of temperature. Graphs. 7 ref. (P15, Q21, Sn)

245-P. (German.) **Malleable Copper-Chromium Alloys as a Material for the Electric Industry.** Hans-Gerhard Petri and Hugo Vosskühler. *Elektrotechnische Zeitschrift,* v. 76, Ausgabe A, no. 11, June 1955, p. 380-385.

Effect of heat treatment and cold working on electrical properties at normal and elevated temperatures. Graphs, photograph, tables, diagram. 12 ref. (P15, Cu)

246-P. (German.) **Conductivity Measurements on Electrolytically Produced Metal Foils.** Albert Keil. *Metalloberfläche,* Ausgabe A, v. 9, no. 6, June 1955, p. 81-84.

Measurement with eddy-current testing instrument and results compared with known conductivities of compact metals. Photographs, tables, graph. 5 ref. (P15)

247-P. (German.) **Magnetic Analysis of Sintered Copper-Nickel Parts.** Karl Torkar and Helmut Götz. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 371-377.

New, accurate, magnetic scale for determining the effect of composition of solid copper-nickel solutions on saturation, magnetization and Curie temperature, and for the quantitative investigation of the sintering process. Diagrams, graphs, tables. 10 ref. (P16, H15, Cu, Ni)

248-P. (Polish.) **Magnetic Methods of Testing Hard and Soft Magnetic Materials.** L. Kozlowski. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 209-214.

Principles and design of the hysteresis tester for determining magnetic hysteresis loop and of demagnetization curve of materials for permanent magnets; types of coercimeters for rapid measurement of the coercive force of magnetization; design of magnetometer for examining magnetic anisotropy and of the texture of cold rolled ferromagnetic strips. (P16, SG-n, p)

249-P. (Russian.) **Problem of Ionic and Homopolar Bond in Semiconductors.** I. M. Tsidil'kovskii. *Doklady Akademii Nauk SSSR,* v. 102, no. 4, June 1, 1955, p. 737-740.

Investigation of thermoelectric and electromagnetic phenomena in PbS, PbSe, PbTe and Cu_2O to determine the type of prevalent bond. Graph. 23 ref. (P15, P16, Pb, Se, Te)

250-P. (Russian.) **Effect of Impurities on the Surface Tension and Recrystallization of Tin.** V. K. Semenchenko, E. Kristian, and V. I. Iveronova. *Doklady Akademii Nauk SSSR,* v. 102, no. 5, June 11, 1955, p. 973-975.

Effect of aluminum, manganese, zinc, tellurium bismuth and sodium impurities on grain size and polymorphic transformation of four types of tin (purified by prolonged heating in vacuum technical grade, etc.). Recrystallization temperatures. Tables. 4 ref. (P10, N5, M27, Sn, Al, Mn, Zn, Te, Bi)

251-P. (Russian.) **Properties and Structure of Ternary Semiconductor Systems. I. Electrical Properties and Structure of Some Materials in a System Thallium-Antimony-Selenium.** B. T. Kolomiets and N. A. Goriunova. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 6, June 1955, p. 984-994.

Sign of the carriers, thermal e.m.f., conductivity and photoconductivity. Graphs, tables, phase diagrams, micrographs. 2 ref. (P15, T1, Sb, Se)

252-P. The Domain Model of Hysteresis. I. Independent Domains. J. A. Enderby. *Faraday Society, Transactions,* v. 51, June 1955, p. 835-848.

Studies of domains in thermodynamic equilibrium. Graphs, diagrams. 4 ref. (P16, P12)

253-P. Adsorption Studies on Metals. IV. The Physical Adsorption of Argon on Oxide-Coated and Reduced Nickel. A. C. Zettlemoyer, Yung-Fang Yu and J. J. Chessick. *Journal of Physical Chemistry,* v. 59, July 1955, p. 588-592.

Comparison of the conclusions from a free energy function with those of isosteric heats and entropies. Table, graphs. 10 ref. (P13, Ni)

254-P. Atomic Heats of Copper, Silver, and Gold From 1° K to 5° K. William S. Corak, M. P. Garfunkel, C. B. Satterthwaite and Aaron Wexler. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1699-1707. ,

Determinations in the temperature interval 1.0 to 5.0° K. The measured values can be described adequately by a linear plus a cubic term in temperature. Diagram, graphs, tables. 25 ref. (P12, Cu, Ag, Au)

255-P. Magnetization Reversal in Thin Films. R. L. Conger. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1752-1754.

An experiment was performed which indicates that magnetization reversal, in evaporated films of 80% nickel, 20% iron, 2×10^{-5} centime-

ter thick, takes place by domain rotation rather than by the motion of 180° domain walls. Photograph, diagrams. 2 ref. (P16, Ni, Fe)

256-P. Pressure Dependence of the Resistivity of Silicon. William Paul and G. L. Pearson. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1755-1756.

The variation of resistivity of high-purity single crystals measured as a function of hydrostatic pressure in the intrinsic range. Results interpreted to give a decrease in energy gap between conduction and valence bands with applied pressure. Graphs. 6 ref. (P15, Si)

257-P. Optical and Impact Recombination in Impurity Photoconductivity in Germanium and Silicon. N. Sclar and E. Burstein. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1757-1760.

Impact (three-body) recombination and optical recombination coefficients calculated for hydrogen-like impurity centers in extrinsic germanium and silicon in thermal equilibrium. Tables. 12 ref. (P15, Ge, Si)

258-P. Water-Vapor-Induced *n*-Type Surface Conductivity on *p*-Type Germanium. R. H. Kingston. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1766-1774.

By utilizing a direct reading instrument, it is possible to measure the *n*-type surface conductance of the *p*-type germanium in an *n-p-n* junction transistor as a function of relative humidity, ambient gas and surface treatment. Diagrams, tables, graphs. 19 ref. (P15, Ge)

259-P. Nuclear Magnetic Resonance Saturation and Rotary Saturation in Solids. Alfred G. Redfield. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1787-1809.

Nuclear spin-lattice relaxation times of aluminum-27 in pure aluminum and copper-63 in annealed pure copper measured with a nuclear induction spectrometer, by the saturation method. "Rotary saturation" is observed by applying an audio-frequency magnetic field to the sample in the d.c. field direction while observing the dispersion derivative at resonance with a large R.F. field. Graphs, diagrams, table. 44 ref. (P16, Al, Cu)

260-P. Magnetic Susceptibility of α Manganese at Low Temperatures. A. Arrott, B. R. Coles and J. E. Goldman. *Physical Review,* v. 98, ser. 2, June 15, 1955, p. 1864-1865.

Measurements made by an induction technique in which a disk-shaped sample is translated between two detecting coils connected in series opposition. Table. 9 ref. (P16, Mn)

261-P. Free Energy Functions of the Solid and Liquid Elements. Leo Brewer. *U. S. Atomic Energy Commission, UCRL*-2992, May 1955, 7 p.

Thermodynamic data for metals at various temperatures. Tables. 8 ref. (P12)

262-P. The Nuclear Properties of Beryllium. John R. Stehn. Paper from "The Metal Beryllium". American Society for Metals, p. 328-366.

Behavior of beryllium towards "mold", "warm", epithermal and fast neutrons; electromagnetic radiations; reactions produced by deuterons, alpha particles and protons. Graphs, tables. 153 ref. (P10, Be)

263-P. (English.) **A Calorimetric Investigation of the System Silver-Tin at 450° C.** O. J. Kleppa. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 255-259.

Heats of formation of ten different solid alloys ranging in composition from 75 to 94 at.% silver derived from heats of solution of the alloys in liquid tin. Graphs, tables. 11 ref. (P12, Ag, Sn)

264-P. (English.) **Application of Gibbs-Duhem Equations to Ternary Systems.** R. Schuhmann, Jr. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 219-226.

A new method for calculating activities, activity coefficients and other partial molal properties for two components in a ternary system by examination of the property in the third component. The derived relations are used to calculate activities of silica, iron oxide and oxygen in ternary iron silicate slags. Phase diagrams. 15 ref. (P12, Fe)

265-P. (English.) **Calorimetric Investigations of a Gold-Nickel Alloy. I. Low Temperature Heat Capacity of Gold-Nickel Alloy. II. The Heat Capacity at High Temperatures and the Entropy of Formation.** Warren DeSorbo and R. A. Oriani. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 227-235.

Values of entropy, enthalpy and free energy evaluated from 13 to 300° K., estimate obtained of the vibrational contribution to the entropy of mixing. Furnishes careful measurements of the deviation from the Kopp-Neumann rule. Tables, graphs. 53 ref. (P12, Au, Ni)

266-P. (English.) **Effect of Order on the Electrical Resistivity of Ferro-**

magnetic Alloys. F. J. Donahoe. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 292-293.

Four cases discussed, based on positions of the Curie and critical temperatures. Graphs. 5 ref. (P15, Fe, Ni, Pt)

267-P. (English.) **Grain Boundaries in Alloys of High Magnetic Permeability.** R. E. S. Walters. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 293-294.

Relates development of high magnetic permeability in nickel-iron-copper-molybdenum alloys to reduction in grain boundaries. Table, graph. (P16, Ni, Fe, Cu, Mo)

268-P. (English.) **An Electron Transfer Mechanism for Ultrasonic Attenuation in Metals.** C. Kittel. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 295-297.

Suggests that in the superconducting state groups of electrons participate in the transfer process without interaction with lattice phonons, provision for energy conservation presumably being made by an internal energy of the group. 8 ref. (P10, P15)

269-P. (English.) **Accurate Determination of Thermal Conductivities.** D. G. Gillam, Lars Rombén, Hans-Erik Nissen and Ole Lamm. *Acta Chemica Scandinavica,* v. 9, no. 4, 1955, p. 641-656.

Accuracy of a hot wire precision method permits accuracy for both solids and liquids up to about $\pm 0.3\%$. Diagrams, graphs. 3 ref. (P11)

270-P. (English.) **On the Activities of Coexisting Elements in Molten Iron. III. The Activity of Mn in Molten Fe-Mn Alloy.** Koji Sanbongi and Masayasu Ohtani. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 2, Apr. 1955, p. 204-209.

Construction of an electrode concentration cell and measurement of the e.m.f. over the whole range of the iron-manganese system. Diagrams, graphs, tables. 15 ref. (P12, Fe, Mn)

271-P. (English.) **Effect of Annealing on Electric Resistance of Cold-Worked Brasses.** Masayuki Kawasaki, Kenji Okuda and Yoji Takahashi. *Technology Reports, Tohoku University,* v. 19, no. 2, 1955, p. 178-191.

Changes in resistance of the brasses, subject to subsequent annealing, are divided into a two-stage behavior—one corresponding to recovery, the other to recrystallization. Data presented to clarify aspects of recovery kinetics. Tables, diagrams, graphs. 14 ref. (P15, J23, N4, N5, Cu)

272-P. (French.) **An Abnormal Beta-Radiation of Metallic Uranium.** Georges Vacca and Louis Perreau. *Comptes rendus,* v. 240, no. 25, June 20, 1955, p. 2404-2405

Surface concentration phenomenon of beta-activity noted after heat treatment of uranium. (P10, U)

273-P. (German.) **Bases for the Development of Soft Magnetic Materials.** Hermann Fahlenbrach. *Elektrotechnische Zeitschrift,* v. 76, Ausgabe A, no. 13, July 1955, p. 449-455.

Characteristics of the materials; internal process of magnetization; influence of purity; ferromagnetic semiconductors. Micrographs, graphs, diagram. 29 ref. (P16, SG-p)

274-P. (German.) **A New Astatic Magnetometer for Measuring Ferromagnetic Plate Specimens in Direct and Alternating Currents.** Kurt Mellentin and Heinrich Lange. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 450-456.

Description of the instrument, structural details, theoretical bases, field of application. Table, graphs, photograph, diagrams. 7 ref. (P16)

275-P. (German.) **An Isothermal Calorimeter for Metallurgical Research.** Jörg Diehl and Reinhold Braun. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 457-461.

Comparative analysis of different calorimetric methods; experimental determination of heat hardening isotherms of aluminum-silver alloy. Graphs, diagrams. 13 ref. (P12, Ag, Al)

276-P. (Russian.) **Electrical Properties of Alloys of the System Nickel-Tellurium.** V. P. Zhuze and A. R. Regel'. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 6, June 1955, p. 978-983.

Electrical conductivity, its temperature coefficient, thermo-electromotive force and temperature conductivity of a system with compositions ranging from 33 to 50 at.% nickel in tellurium. Graphs, tables. 9 ref. (P15, Ni, Te)

277-P. Mechanisms of Hydrogen Producing Reactions on Palladium. James P. Hoare and Sigmund Schuldiner. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 485-489.

Hydrogen overvoltage mechanisms on palladium, in H_2SO_4 and H_2SO_4 + Na_2SO_4 solutions, postulated in three regions. Graphs. 12 ref. (P15, Pd)

278-P. Activity of Sulphur in Liquid Fe-Ni Alloys. Jean A. Cordier and John Chipman. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Aug. 1955, p. 905-907.

Using gas equilibrium methods, the chemical behavior of sulfur in liquid steel is independent of the nickel content and has the same activity and free energy in liquid nickel and iron-nickel alloys as in liquid iron. Table, graph. 7 ref. (P12, Fe, Ni)

279-P. The Significance of Wetting in Reactor Technology. J. W. Taylor. *Journal of Nuclear Energy,* v. 2, Aug. 1955, p. 15-30.

Fundamental forces responsible for the spreading of a liquid metal on a solid (or a liquid) surface, interfacial tension and spreading studies analyzed in terms of theoretical considerations. Diagrams, tables, graph. 32 ref. (P10)

280-P. Surface Tension at Elevated Temperatures. II. Effect of C, N, O and S on Liquid Iron Surface Tension and Interfacial Energy With Al_2O_3. F. A. Halden and W. D. Kingery. *Journal of Physical Chemistry,* v. 59, June 1955, p. 557-559.

At 1570° C., surface tension of pure iron is 1720 dynes $cm.^{-1}$. Oxygen and sulfur form monolayers when below 0.1%. Table, graphs. 13 ref. (P10, Fe)

281-P. Thermodynamic Analysis of Two-Component and Multicomponent Systems. I. Determination of Activities of Components in Homogeneous and Heterogeneous Systems From Calorimetric Measurements Alone. W. Oelsen, E. Schürmann and G. Heynert. *Henry Brutcher Translation No.* 3521, 21 p. (Condensed from *Archiv für das Eisenhuttenwesen,* v. 26, no. 1, 1955, p. 19-25.) Henry Brutcher, Altadena, Calif.

Usefulness of the analysis in solving technically important problems by calorimetry. Derivation and application of basic equataions for deduction of activities of components in such systems. Graphs. 4 ref. (P12)

282-P. Superconductivity and Lattice Vibrations. J. Bardeen. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 5-10.

Nature of wave functions and energies for electrons in superconductors, theory that leads to equations that explains electromagnetic properties of the superconducting phase. Diagrams. 7 ref. (P15, M26)

283-P. On the Nature of the Superconducting Transition. L. Tisza. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 11-20.

A half phenomenological theory that provides a comprehensive qualitative framework for the quantum mechanics of solids. The adiabatic approximation, nonmetallic crystals at finite temperatures and normal and superconducting metals discussed. 12 ref. (P15)

284-P. Superconductivity of Tin Isotopes. J. M. Lock, A. B. Pippard, and D. Shoenberg. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 31-32.

Measurements of transition temperatures and critical magnetic fields of isotopes of tin that have been electromagnetically separated. 6 ref. (P15, P16, Sn)

285-P. Superconductivity at the Clarendon Laboratory. K. Mendelssohn. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 33-36.

Studies on the isotope effect, mechanism of transition and heat conductivity in the superconductivity and normal states. Table, graph. (P15, M25)

286-P. Heat Transfer in Superconducting Alloys. J. K. Hulm. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 37-41.

Experimental data for a very uniform composition, single-crystal specimen containing 10 at.% of thallium, the highest composition to which the heat conduction measurements have so far been extended. Graphs. 8 ref. (P11, P15, Tl)

287-P. Superconduction Properties of Indium-Thallium Alloys. J. W. Stout and Lester Guttman. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 51-60.

Studies behavior of a solid solution and the indium-thallium system to determine the Meissner effect and the resistance transition curve. Tables, graphs, diagrams. 7 ref. (P15, In, Tl)

288-P. Investigation of Superconductivity in Lead Compounds. Gold Alloys, and Molybdenum Carbide. R. P. Hudson and K. Lark-Horovitz. Paper from "Low-Temperature Physics". Superintendent of Documents,

U. S. Government Printing Office, p. 61-63.

Use of the ballastic-throw magnetic method of detection to distinguish between a bulk effect and an impurity. 7 ref. (P15, Au, Mo, Pb)

289-P. Magnetic Properties of a Hollow Superconducting Lead Sphere. Julius Babiskin. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Ofice, p. 77-79.

Measurements to determine nature of the equatorial magnetic field distributions inside and outside a hollow sphere. Graphs. 5 ref. (P16, Pb)

290-P. Eddy Currents and Supercurrents in Rotating Metal Spheres at Liquid-Helium Temperatures. P. B. Alers, J. W. McWhirter and C. F. Squire. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 85-88.

Data to show similarity between intensity and distribution of eddy currents and the superconducting surface currents that produce the Meissner effect. Diagram, graphs. 2 ref. (P16, P15, Sn)

291-P. Atomic Heat of Indium at Liquid-Helium Temperatures. J. R. Clement and E. H. Quinnell. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 89-97.

Calorimetric measurements to determine specific heat of superconducting elements in both the normal and superconducting states. Diagram, graph. 11 ref. (P12, P15, In)

292-P. Specific Heat of Niobium at Various Temperatures. A. Brown, M. W. Zemansky and H. A. Boorse. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 99-101.

Method of circumventing discrepancies in the calculation of the specific heat by the use of calorimetry. Graphs. 3 ref. (P12, Cb)

293-P. High-Frequency Resistance of Tin, Lead, and Indium. C. J. Grebenkemper and John P. Hagen. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 103-108.

Surface resistance of several metals measured, using a resonant cavity of cylindrical shape operating in the lowest mode. Graphs. 6 ref. (P15, In, Pb, Sn)

294-P. A New Effect Found in Paramagnetic Crystals Below 100 Millidegrees Absolute: The Critical-Field Curve Bounding the Antiferromagnetic State. C. G. B. Garrett. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 229-233.

Evidence for the existence of "critical-field" phenomena in antiferromagnetic crystals, considering, in particular, results of some magnetic measurements made at temperatures below 1 K° on a single crystal of cobalt-ammonium sulfate. Graph. 6 ref. (P16, Co)

295-P. Current Sensitivity and Other Characteristics of Metal Films at Low Temperatures. A. van Itterbeek. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 243-247.

Resistance of thin nickel films at low temperatures. Graphs, micrographs. 5 ref. (P15, Ni)

296-P. Normal Resistivities at Low Temperatures. K. Mendelssohn. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 253-256.

Temperature dependence of the resistivity of the alkali and alkaline earth metals. Graphs. (P15, Na, Li)

297-P. Approximate Calculations of the Surface Impedance of a Metal in the Anomalous Region. P. M. Marcus. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 265-272.

Phenomenon in metals, considering the current and field separately as functions of position. Graphs, diagram. 6 ref. (P15)

298-P. Specific Heat on Silicon Below 100° K. P. H. Keesom and N. Pearlman. Paper from "Low-Temperature Physics". Superintendent of Documents, U. S. Government Printing Office, p. 279-283.

Extension of the measurements of specific heat of silicon to a maximum of 103° K. Graphs. 11 ref. (P12, Si)

299-P. (Book.) **Low-Temperature Physics.** National Bureau of Standards Circular 519. 291 p. 1952. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $2.00

Proceedings of the NBS Semicentennial Symposium on Low Temperature Physics, covering properties of liquid helium, superconduc-

tivity, calorimetry, thermometry, and liquefier development. Pertinent papers are individually abstracted. (P general)

300-P. (Book.) **The 1955 Heat Transfer and Fluid Mechanics Institute.** Papers individually paged. 1955. University of California, Los Angeles. $5.50.

Twenty papers given at the University of California, Los Angeles, on heat transfer and physics of flow of gases, liquids, and metals. Tables, photographs, graphs, diagrams. 231 ref. (P general)

301-P. (Book.) **The Solid State.** (L'etat solide) R. Stoops, editor. 576 p. 1952. Institut International de Physique Solvay, 76-78, Coudenberg, Brussels, Belgium.

Sixteen English, German, and French reports on solid-state physics presented at the Ninth Council of Physics at Brussels, Belgium in Sept. 1951. Papers are individually abstracted. (P general, N general)

302-P. (Book.) **Optical Properties of Thin Solid Films.** O. S. Heavens. 261 p. 1955. Academic Press, 125 East 23rd Street, New York 10, N. Y. $6.80.

Formation; structure; optics; measurements of film thickness and optical constants. (P17, S14)

303-P. Adsorption of Carbon Monoxide and Hydrogen on Cobalt: Presorption Experiments. M. V. C. Sastri and T. S. Viswanathan. *American Chemical Society, Journal,* v. 77, Aug. 5, 1955, p. 3967-3971.

Effect of the prior adsorption of carbon monoxide on the subsequent adsorption of hydrogen and vice-versa studied on a cobalt Fischer-Tropsch catalyst at temperatures below that of detectable reaction on the catalyst surface. Graphs, tables. 19 ref. (P13, Co)

304-P. The Resistance of the Oxide-Coated Cathode at Ultra-High Frequencies. L. J. Herbst and J. E. Houldin. *British Journal of Applied Physics,* v. 6, July 1955, p. 236-238.

The impedance of the oxide-coated cathode of disk seal triodes measured at frequencies from 730 to 2360° mc. per sec. and with cathode temperatures from 1250 to 1400° K. Diagrams, tables. 3 ref. (P15)

305-P. The Measurement of Iron Losses in Sheet Steels. F. Brailsford. *Institution of Electrical Engineers, Journal,* v. 1, July 1955, p. 446-448.

Equipment and methods for measuring losses at high values of magnetic induction. Graphs, diagram. 1 ref. (P16, SG-p)

306-P. Measurement of Temperature Coefficient of Resistance. H. Philip Hovnanian. *Instruments and Automation,* v. 28, Aug. 1955, p. 1324-1326.

Analysis of effect of measuring errors on final result. Diagrams, table. 5 ref. (P15)

307-P. The Specific Heats of Magnesium and Zinc. P. L. Smith. *Philosophical Magazine,* v. 46, 7th ser., no. 378, July 1955, p. 744-750.

Experimental procedures and results of measurements between 1 and 20° K. on magnesium and 4 and 20° K. on zinc. Graphs. 12 ref. (P12, Mg, Zn)

308-P. Digital Computer as a Laboratory Tool. Arthur L. Loeb and Harry H. Denman. *Society for Industrial and Applied Mathematics, Journal,* v. 3, Mar. 1955, p. 1-16.

Electronic digital computation of optical constants of thin metal films. Diagram, table. 5 ref. (P17)

309-P. Properties of Germanium and Silicon. Esther M. Conwell. *Sylvania Technologist,* v. 8, July 1955, p. 86-90.

Review of recent germanium and silicon research. Information on the band structure and effective masses, account of such successes in the areas of infra-red absorption and magnetic field effects. Diagrams, graph. 32 ref. (P general, Ge, Si)

310-P. (English.) **Magnetic Properties of Cobalt Telluride.** Enji Uchida. *Physical Society of Japan, Journal,* v. 10, no. 7, July 1955, p. 517-522.

Results reported for Co Te_x, where x is the molal content, with measurements made in the temperature range between liquid air and 1150° C. Tables, graphs. 9 ref. (P16, Co, Te)

311-P. (English.) **On the Maze Domain of Silicon-Iron Crystal. I.** Soshin Chikazumi and Kenzo Suzuki. *Physical Society of Japan, Journal,* v. 10, no. 7, July 1955, p. 523-534.

Examination of the maze-like domain which appears on the mechanically polished surface of a silicon-iron crystal by powder pattern techniques. Micrographs, graphs, diagrams. 5 ref. (P16, Fe, Si)

312-P. (French.) **Reaction of Iron With Oxygen at Low Pressures and at Temperatures Between 650 and 850° C.** Earl A. Gulbransen, William R. McMillan and Kenneth F. Andrew. *Revue de metallurgie,* v. 52, no. 7, July 1955, p. 509-516; disc., p. 517.

Recent studies on annealed and highly electropolished specimens of

Puron and Armco iron with the help of electronic optical methods. Discontinuous oxidation is observed and results interpreted in terms of substructure of the metal. Tables, micrographs, diffractograms. 17 ref. (P12, M27, Fe)

313-P. (German.) **Density and Viscosity of Liquid Aluminium and Aluminium Alloys.** E. Gebhardt, M. Becker and S. Dorner. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 315-321.

Measurements have been made of the density and viscosity of superpurity Al, and Al-Cu, -Mg, -Fe, -Ti, and -Zn alloys, to determine effect of these properties on castability. Tables, graphs, diagram. 28 ref. (P10, E general, Al)

314-P. (German.) **Investigation of the Electrical Conductivity of Aluminium.** P. Eversheim. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 338-341.

Effect of heat treatment and cold working on conductivity and tensile strength of hard-drawn pure aluminum wires, having iron-silicon ratios of 1:1, 1:2, and 1:3. Graphs. 4 ref. (P15, Q23, Al)

315-P. (German.) **The Electrical Conductivity of Super Purity Aluminium.** E. Nachtigall. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 341-342.

Shows that cold deformation affects the conductivity of aluminum much less than that of normal pure aluminum. Differences also occur between solution and precipitation-heat treated metals. Graphs. 4 ref. (P15, Al)

316-P. (German.) **The Initial Permeability of Several Ferrous Materials Under Mechanical Stress.** Werner Jellinghaus and Klaus Janssen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 7, July 1955, p. 405-419.

Experimental study of four different steels subjected to tensile stresses within the elastic range; determination of the elastic limit by measuring the initial permeability; theory of the magnetization process; effect of demagnetization on the permeability of mechanically stressed material. Graphs, diagrams, tables, micrographs. 22 ref. (P16, Q23, Q21, ST)

317-P. (German.) **Magnetic Balance for Measuring Susceptibility.** Heinrich Beisswenger and Ernst Wachtel. *Zeitschrift für Metallkunde,* v. 46, no. 7, July 1955, p. 504-507.

Construction details of a balance, used in metallographic measurements, permits separation between para and ferromagnetic components of a specimen. Graphs, diagrams. 5 ref. (P16, M23, ST)

318-P. (German.) **Theory of the Magnetic Barrier Layer in Semiconductors.** O. Madelung, L. Tewordt and H. Welker. *Zeitschrift für Naturforschung,* v. 10a, no. 6, June 1955, p. 476-488.

Mathematical analysis of the theory and the possibility of expanding it. Graphs. 11 ref. (P15)

319-P. (German.) **Magnetic Barrier Layers in Germanium II.** E. Weisshaar. *Zeitschrift für Naturforschung,* v. 10a, no. 6, June 1955, p. 488-495.

Experimental verification of magnetic barrier layer theory. Method and procedure. Graphs, diagram. 7 ref. (P15, Ge)

320-P. (German.) **Gallium-Arsenic Photo-Element.** R. Gremmelmaier. *Zeitschrift für Naturforschung,* v. 10a, no. 6, June 1955, p. 501-502.

Attempt to transform solar energy to electricity by means of a gallium-arsenic photo-element. Graphs. 4 ref. (P15, As, Ga)

321-P. (Italian.) **Fifteen Years of Research on Electro-Chemistry of Metals.** Roberto Piontelli. *Ricerca scientifica,* v. 25, no. 4, Apr. 1955, p. 750-775.

Review of Italian research at the University of Milan. Photographs, diagrams. 120 ref. (P15, L17)

322-P. (Russian.) **Effect of Heat Treatment on the Concentration and Mobility of Charge Carriers in Germanium.** V. V. Ostroborodova and S. G. Kalashnikov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 7, July 1955, p. 1163-1167.

Mobility of basic and nonbasic charge carriers decreases greatly near the zone of transformation. Effect of nonhomogeneities in the crystal. Graphs, tables. 21 ref. (P15, Ge)

323-P. (Russian.) **Recombination of Non-Equalized Charge Carriers on Thermal Acceptors in Germanium.** V. V. Ostroborodova and S. G. Kalashnikov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 7, July 1955, p. 1168-1174.

Investigation of the influence of heat treatment on the rate of volumetric recombination of nonequalized electroms and holes in germanium. Diagrams, table, graphs. 10 ref. (P15, Ge)

324-P. (Russian.) **Thermoelectrical Properties of Alloys of the Antimony-Tellurium System.** F. I. Vasenin.

Zhurnal Tekhnicheskoi Fiziki, v. 25, no. 7, July 1955, p. 1190-1197.

Preparation of alloys by melting in vacuum and by powder metallurgy to avoid liquation. Influence of additions and cooling rate on electrical properties. Tables, graphs. 2 ref. (P15, C25, H10, Sb, Te)

325-P. Ultrasonic Attenuation Measurements. Rohn Truell. *American Society of Mechanical Engineers, Paper No.* 55—S-17, 1955, 7 p.

Theory of ultrasonic-wave attenuation; measuring techniques. Applications for determining properties, flaws and structure. Graphs, photographs, micrographs, diagrams. (P10, S13, M23, S general)

326-P. Liquid Metals. II. The Surface Tension of Liquid Sodium: the Drop-Volume Technique. C. C. Addison, W. E. Addison, D. H. Kerridge and J. Lewis. *Chemical Society, Journal,* 1955, July, p. 2262-2264.

Measured from 110 to 200° C. in pure argon by above method. Graph, diagram. 5 ref. (P10, Na)

327-P. The Viscosity of Liquid Iron and Iron-Carbon Alloys. R. N. Barfield and J. A. Kitchener. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 324-329.

Alloys with up to 4.4% carbon studied by oscillating crucible method. Carbon markedly reduces viscosity but increases activation energy for flow. Graphs, diagrams. 22 ref. (P10, P12, CI)

328-P. Solubility of Nitrogen in Alpha-Iron. J. D. Fast and M. B. Verrijp. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 337-343.

Internal friction of fine-grained textureless alpha-iron wires caused by nitrogen shown to be proportional to nitrogen content. Solubilities of nitrogen in alpha-iron in equilibrium with Fe_8N, Fe_4N, and N_2 of one atmosphere, respectively, measured and expressed mathematically. Tables, graphs. 25 ref. (P13, P12, Fe)

329-P. The Effect of Alloying Elements on the Solubility of Nitrogen in Iron. I. The Solubility of Nitrogen in Pure Iron and in 2.83% Silicon Iron. N. S. Corney and E. T. Turkdogan. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 344-348.

Nitrogen in alpha-iron determined at various temperatures and nitrogen potentials. Dissolved silicon (2.83%) reduces solubility of nitrogen in alpha-iron, for example, from 0.0033% to 0.0019% at 900° C. under one atmosphere of nitrogen. Graphs, diagram. 14 ref. (P13, P12, Fe, Si)

330-P. The Solubility of Sulphur in Iron and Iron-Manganese Alloys. E. T. Turkdogan, S. Ignatowicz, and J. Pearson. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 349-354.

Solid solubility of sulfur in gamma-iron determined at 1000, 1200 and 1335° C. Manganese measurably reduces sulfur solubility. Graphs, diagram, phase diagram. 10 ref. (P13, P12, N12, Fe, Mn, S)

331-P. The Enthalpy and Specific Heat of Iron and Steel. J. R. Pattison. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 359-368.

Tabulates true specific heats up to 1000° C. and heat contents up to 1400° C. Tables, graphs. 79 ref. (P12, CI, ST)

332-P. Preparation of Thin Magnetic Films and Their Properties. M. S. Blois, Jr. *Journal of Applied Physics,* v. 26, Aug. 1955, p. 975-980.

Preparation by vacuum evaporation of single thin layers and laminated structures of ferromagnetic alloys. Properties related to those parameters of the process which may be chosen to yield materials having desired characteristics. Graphs, diagram. 11 ref. (P16, L25, Fe, Ni, AY)

333-P. Domain Configurations and Crystallographic Orientation in Grain-Oriented Silicon Steel. W. S. Paxton and T. G. Nilan. *Journal of Applied Physics,* v. 26, Aug. 1955, p. 994-1000.

Orientation of individual grains of 3.25% silicon steel determined by the etch-pit optical-goniometer technique. Relationship found between the domain patterns and crystalline orientation. Diagrams, micrographs. 7 ref. (P16, M26, SG-p)

334-P. Radiation Induced Changes in the Electrical Resistivity of Alpha Brass. D. B. Rosenblatt, R. Smoluchowski and G. J. Dienes. *Journal of Applied Physics,* v. 26, Aug. 1955, p. 1044-1049.

Measures resistivity of brasses containing 10, 20 and 30% zinc at room temperature and 80 and 4° K. Alloys were irradiated in a nuclear reactor at +50° C. and 80° K. Tables, graphs. 20 ref. (P15, Cu, Zn)

335-P. Effect of Pressure on the Electrical Properties of Indium Antimonide. Donald Long. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 388-390.

Electrical resistivity and Hall coefficient of indium antimonide measured as a function of pressure to 2000 atmospheres at 0, 24.3 and 54.3° C. Graphs, tables. 4 ref. (P15, In, Sb)

336-P. Electrical Properties of *p*-Type Indium Antimonide at Low Temperatures. H. Fritzsche and K. Lark-Horovitz. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 400-405.

Electrical resistivity, Hall coefficient and transverse magnetoresistive ratio of single crystals measured between 370 and 1.5° K. Graphs, table. 19 ref. (P15, In, Sb)

337-P. Electrical Properties of Germanium Semiconductors at Low Temperatures. H. Fritzsche. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 406-418.

Low-temperature anomalies in the Hall coefficient and electrical resistivity investigated at temperatures between 1.5 and 300° K. using single crystals of *n*- and *p*-type germanium of various impurity concentrations. Tables, graphs. 19 ref. (P15, Ge)

338-P. Cohesive Energy of Noble Metals. K. Kambe. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 419-422.

Calculations include the effects of the deviation of the effective ion-core potential from pure hydrogenic form in the vicinity of the surface of the *s*-sphere. Formula derived for calculating logarithmic derivative of the wave function at the surface of the *s*-sphere. Tables. 13 ref. (P12, EG-c)

339-P. Specific Heat of Bismuth at Liquid Helium Temperatures. K. G. Ramanathan and T. M. Srinivasan. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 442-443.

Investigations at temperatures down to 1.3° K. by means of a new vacuum calorimeter. Graph. 7 ref. (P12, Bi)

340-P. Optical Properties of Plastically Deformed Germanium. H. G. Lipson, E. Burstein and Paul L. Smith. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 444-445.

N-type germanium specimens of one ohm-cm. resistivity were plastically deformed from 3 to 15% at about 700° C. The more strongly deformed specimens were found to be converted to *p*-type. All of the deformed specimens exhibited a shift in the intrinsic absorption. Graphs. 7 ref. (P17, Q24, Ge)

341-P. Heat Capacities of Vanadium and Tantalum in the Normal and Superconducting Phases. R. D. Worley, M. W. Zemansky and H. A. Boorse. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 447-458.

Determinations between 1.7 and 5° K. Graphs, tables. 36 ref. (P12, V, Ta)

342-P. Optical Properties of Indium-Doped Silicon. R. Newman. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 465-467.

Absorption and photoconduction studied at low temperatures. Graphs. 4 ref. (P17, Si)

343-P. Magnetic Susceptibility of Indium Antimonide. D. K. Stevens and J. H. Crawford, Jr. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 487-488.

Measurements of both *n*- and *p*-types at tempeautrers from 65 to 650° K. Graphs. 4 ref. (P16, In, Sb)

344-P. Effect of Pressure on the Electrical Conductivity of InSb. Robert W. Keyes. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 490-495.

Measurements as a function of temperature from −78 to +300° C. and pressures up to 12,000 kg. per sq. cm. Graphs, diagram. 17 ref. (P15, In, Sb)

345-P. The Design of Engineering Magnetic Materials. K. Hoselitz. *Times Science Review,* 1955, Autumn, p. 8-9.

Principles that form the basis of the technology of magnetic materials engineering and some of results achieved. Diagrams, photographs, table. (P16, SG-n, p)

346-P. On the Dephosphorization of Steel Baths. H. O. von Samson-Himmelstjerna. *Henry Brutcher Translation No.* 134, 18 p. (From *Archiv für das Eisenhüttenwesen,* v. 6, no. 11, 1932-33, p. 471-475.) Henry Brutcher, Altadena, Calif.

Thermochemical data on heats of formation of Fe_2P and phosphates of various oxides, checked on the basis of heating curves of solid mixtures of Fe_2P with oxides; prediction of direction of reaction in liquid state. Graphs, micrographs. 12 ref. (P12, ST)

347-P. (Czech.) **Properties and Use of Sintered Permanent Magnets.** Zdenek Ministr. *Hutnické Listy,* v. 10, no. 7, July 1955, p. 389-396.

Properties of sintered and cast permanent magnets AlNi and advantages and disadvantages of both production methods compared. Diagrams, graphs, tables, micrographs. 8 ref. (P16, SG-n)

348-P. (German.) **Effect of Temperature on the Resistance Behavior of Vapor-Deposited Bismuth Bolometers.** H. Reimann. *Annalen der Physik,* v. 16, nos. 1-2, 1955, p. 52-58.

Measurement of temperature coef-

ficient of bismuth coating as function of film thickness. Attempt to prevent aging effects by heat treatment. Graphs, tables. 6 ref.
(P15, L25, J general, Bi)

349-P. (German.) **Stabilizing Processes in Permanent Magnets.** Ilse Titz, Franz Raidl, and Helmut Krainer. *Archiv für das Eisenhüttenwesen,* v. 26 no. 8, Aug. 1955, p. 491-496.

Course of induction in permanent magnet materials at a cyclic change of field intensity of the negative outside field. Description of N. Neumann's test apparatus. Tables, diagrams, graphs. 7 ref.
(P16, SG-n)

350-P. (German.) **New Materials of Large Hall Effect and Large Resistance Change in the Magnetic Field.** Heinrich Welker. *Elektrotechnische Zeitschrift,* v. 76, Ausgabe A, no. 15, Aug. 1955, p. 513-517.

Physics of galvanomagnetic effects and effect of shape of indium stibnide and indium arsenide on resistance variation and Hall effect as functions of magnetic induction. Diagrams, graphs, tables. 10 ref.
(P15, P16, In, Sb, As)

351-P. (German.) **Galvanomagnetic Effects in Semiconductors.** Otfried Madelung. *Naturwissenschaften,* v. 42, no. 14, July 1955, p. 406-410.

Hall effect and resistance change in the transverse magnetic field in impurity semiconductors, intrinsic semiconductors and metals; magnetic blocking-layer and other galvanomagnetic effects. Diagrams, graphs. 14 ref.
(P15, P16)

352-P. (German.) **Antiferromagnetism in Manganese-Copper and Manganese-Gold Alloys.** Albrecht Kussmann and Ernst Raub. *Naturwissenschaften,* v. 42, no. 14, July 1955, p. 411.

Effect of composition and temperature on magnetic susceptibility; normal ferromagnetism in the stoichiometric compound, Au_4Mn. Graph. 2 ref.
(P16, Cu, Mn, Au)

353-P. (German.) **Superconduction and Resistance of Thin Indium Layers With Lattice Dislocations and Additions of Foreign Metal.** Wolfgang Opitz. *Zeitschrift für Physik,* v. 141, no. 3, 1955, p. 263-276.

Effect of temperature of deposition and thickness on resistance and superconducting properties of vapor-deposited indium films; increased freezing-in of lattice dislocations and increase in critical temperature of superconduction with decreasing temperature of deposition; effect of copper, lead, zinc, chromium, manganese and iron additions on lattice distortions. Graphs. 10 ref. (P15, In)

354-P. (German.) **Effect of Diffusion Length and Surface Recombination on the Blocking-Layer Photoeffect in Germanium.** H. U. Harten and W. Schultz. *Zeitschrift für Physik,* v. 141, no. 3, 1955, p. 319-334.

Preparation of photocells of relatively large surfaces by vapor-depositing a translucent film of gold on germanium; determination of diffusion length of minority charge carriers in "thick" cells and recombination rate of charge carriers on free surface of germanium plate in "thin" cells from the spectrum pattern of sensitivity. Diagrams, graphs, tables. 22 ref.
(P15, N1, Au, Ge)

355-P. (Russian.) **Heat Content and Thermal Capacity of Iron and Cast Iron.** I. P. Egorenkov. *Liteinoe Proizvodstvo,* 1955, no. 7, July, p. 20-24.

Comparative analysis of the heat content and thermal capacity of pure iron and cast iron components. Heat of melting (solidification) of steel and cast iron. Tables, graphs. 8 ref. (P12, N12, Fe, CI)

356-P. **The Surface Energies of the Alkali Metals.** J. W. Taylor. *Philosophical Magazine,* v. 46, 7th ser., no. 379, Aug. 1955, p. 867-876.

Energies and temperature coefficients determined experimentally. Values for lithium and sodium agree with earlier work. Tables, graphs, diagram. 15 ref.
(P12, K, Li, Na)

357-P. **The Structure and Magnetic Properties of the Alloy Mn_3AlC.** R. G. Butters and H. P. Myers. *Philosophical Magazine,* v. 46, 7th ser., no. 379, Aug. 1955, p. 895-902.

The single phase as-cast alloy, similar to the alloy Mn_3ZnC, was feebly magnetic but retained this state after homogenization at 1000° C. Alloy is strongly magnetic at low temperatures. Tables, graphs. 4 ref. (P16, Al, Mn)

358-P. **Electron Transport in Copper and Dilute Alloys at Low Temperature. III. Solid Solutions of Iron in Copper. IV. Resistance Minimum: Temperature of Occurrence as a Function of Solute Concentration.** W. B. Pearson. *Philosophical Magazine,* v. 46, 7th ser., no. 379, Aug. 1955, p. 911-923.

Measurements made between 4.2 and 50° K. show that iron gives rise

to particularly large anomalous thermoelectric effects and minima in the resistance when dissolved in copper. Presents temperature where the resistance minimum occurs for a large number of dilute copper alloys containing iron, gallium, indium, silicon, germanium, tin, lead and bismuth as solutes. Graphs. 19 ref.
(P15, N12, Bi, Cu, Fe, Ga, Ge, In, Pb, Si, Sn)

359-P. A Study of Domain Structures in Alnico. L. F. Bates and D. H. Martin. *Physical Society Proceedings,* v. 68, no. 428B, Aug. 1955, p. 537-540.
Record of a powder deposit examination of the ferromagnetic domain structures in four specimens of Alnico in which were developed coercivities of about 2 (quenched), 10, 40 and 100 oersteds respectively. 4 ref. (P16, SG-n)

360-P. High-Current Arc Erosion of Electric Contact Materials. W. R. Wilson. *Power Apparatus and Systems,* 1955, no. 19, Aug., p. 657-664; disc., p. 664.
Data on arc erosion rates for the following elements listed in order of excellence: carbon, tungsten, molybdenum, nickel, iron, titanium, copper, silver, zinc, aluminum and tin. Graphs, diagrams, tables, photograph. 16 ref. (P15, SG-r)

361-P. Metal Foils as Filters in the Soft X-Ray Region. D. H. Tomboulian and D. E. Bedo. *Review of Scientific Instruments,* v. 26, Aug. 1955, p. 747-750.
Use of thin foils of beryllium, magnesium and aluminum as filters in the 50 to 400 A spectral region. Graph, X-ray spectra. 6 ref.
(P17, T8, Al, Be, Mg)

362-P. The Magnetic Threshold Curve of Superconductors. B. Serin. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 138-150.

Thermodynamic theory, specific heat of superconductive tin, effects of impurities. Graphs, table. 36 ref. (P12, P16, Sn)

363-P. The Effect of Pressure and of Stress on Superconductivity. C. F. Squire. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 151-158.
Theory and review of present knowledge. Studies with bismuth and bismuth alloys. Graphs, diagrams, table. 29 ref. (P15, Bi)

364-P. Heat Conduction in Superconductors. K. Mendelssohn. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 184-201.
Theory, results at temperatures below 1° K. Graphs, diagram. 31 ref. (P11, P15)

365-P. The Electronic Specific Heats in Metals. J. G. Daunt. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 202-223.
Evaluation from low-temperature calorimetric measurements and magnetic observations; superconductors; influence of inter-electronic interaction. Graphs, tables. 108 ref. (P12)

366-P. Antiferromagnetic Crystals. N. J. Poulis and C. J. Gorter. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers Inc., p. 245-271.
Low-temperature mol. field theory of anisotropic crystals; magnetization as a function of the field; antiferromagnetic resonance. Graphs. 50 ref. (P16)

367-P. Adiabatic Demagnetization. D. de Klerk and M. J. Steenland. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 272-335.
Low-temperature experimental methods, magnetic behavior, nuclear orientation and demagnetization. Diagrams, graphs, table, circuit diagrams. 138 ref. (P16)

368-P. Theoretical Remarks on Ferromagnetism at Low Temperatures. L. Néel. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 336-343.
Effects of finely dispersed substances, substances with Bloch walls, thermal activation. 9 ref. (P16)

369-P. Experimental Research on Ferromagnetism at Very Low Temperatures. L. Weil. Paper from "Progress in Low Temperature Physics". v. I. Interscience Publishers, Inc., p. 344-354.
Methods of measurement, results obtained with fine powders, films and alloys, magnetic relaxation. Graphs, diagrams, table. 22 ref. (P16)

370-P. (English.) **The Heats of Formation in the Systems Titanium-Aluminium and Titanium-Iron.** O. Kubaschewski and W. A. Dench. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 339-346.
Calorimeter constructed for deter-

mining exothermic heats of alloying. Possibility of producing titanium-aluminum from TiO_2 and excess aluminum. Diagram, tables, graphs, micrographs. 8 ref.
(P12, M24, Al, Fe, Ti)

371-P. (English.) **Electron Transport in Copper and Dilute Alloys at Low Temperatures. I-II.** D. K. C. MacDonald and W. B. Pearson. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 392-408.

Experimental studies of a wide range of alloys, problems involved in preparing such very dilute alloys, interpreting the findings. Graphs, tables. 40 ref. (P15, Cu)

372-P. (German.) **The Measuring of Heat Conductivity According to Diesselhorst.** O. Rüdiger and H. D. Dietze. *Technische Mitteilungen Krupp,* v. 13, no. 3, July 1955, p. 56-61.

Theoretical bases of the Kohlrausch and Diesselhorst method. The technique of measuring the heat conductivity of metallic conductors. Diagrams, photograph, graph. 4 ref. (P11)

373-P. (German.) **Magnetic Resistance Change of Germanium Monocrystals Between 10 and 300° K.** G. Lautz and W. Ruppel. *Zeitschrift für Naturforschung,* v. 10a, no. 7, July 1955, p. 521-526.

Experiments show that the absolute resistance change measured on *p*- and *n*-conducting germanium crystals are considerably higher than the theoretical resistance change. Graphs. 10 ref.
(P16, Ge)

374-P. (German.) **Electrical and Optical Properties of Silver Telluride, Ag_2Te.** Joachim Appel. *Zeitschrift für Naturforschung,* v. 10a, no. 7, July 1955, p. 530-541.

Phase transformation and change in electrical properties at 150° C.; studies of temperature effect on electrical conductivity and galvanomagnetic effects on stoichiometric *n*-conducting specimens of low-temperature or beta phase indicate a covalent metallic bond and also that germanium, tin and antimony atoms have a great effect on charge-carrier concentration and mobility. Graphs, table. 13 ref.
(P15, P17, N6, Ag, Te)

375-P. (Russian.) **Electrical and Thermal Conductivity of Certain Copper-Nickel Sulfide Alloys.** D. M. Chizhikov, Z. F. Gulianitskaia and N. N. Bogovarova. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 6, June, p. 109-113.

Compositions of alloys of copper, nickel and iron sulfides. Relation between amount of iron and the specific electroconductivity and thermal conductivity of the copper-nickel mattes. Tables, graphs. 1 ref.
(P15, P11, Cu, Ni, Fe)

376-P. (Russian.) **Differential Magnetic Method for Investigating Steel and Alloys.** V. G. Permiakov, Iu. V. Naidich and S. A. Rybak. *Zavodskaia Laboratoriia,* v. 21, no. 6, June 1955, p. 695-699.

Theoretical bases of proposed method for determining degree of magnetization; sample determination of residual austenite. Graphs, diagrams. 5 ref.
(P16, M23, ST)

377-P. (Russian.) **Influence of Interelectron Collisions on Electrical Conductivity and Skin-Effect in Metals.** V. L. Ginzburg and V. P. Silin. *Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki,* v. 29, no. 1, July 1955, p. 64-74.

Mathematical treatment. Tables. 20 ref. (P15)

378-P. (Book.) **Progress in Low Temperature Physics.** C. J. Gorter, editor. Series in Physics. v. I. 418 p. 1955. North Holland Publishing Co., Amsterdam. $8.75; Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y.

Recent research and present status of knowledge in magnetism, liquid helium, and superconductivity.
(P general)

379-P. **The Néel Theory of Ferrimagnetism.** J. Samuel Smart. *American Journal of Physics,* v. 23, Sept. 1955, p. 356-370.

Molecular-field theory of magnetic ordering in systems which contain nonequivalent substructures of magnetic ions. Graphs, diagrams. 36 ref. (P16)

380-P. **A Differential Dilatometer for Rapid Determination of Thermal Expansion Coefficients Near Room Temperature.** R. M. Mayfield. *Argonne National Laboratory (U. S. Atomic Energy Commission),* ANL-5221, July 1953, 17 p.

Design, calibration, operation, results and limitations of a mechanical type dilatometer. The precision and accuracy are such that changes of expansion characteristics with metallurgical treatment may be easily analyzed. Tables, graphs, photographs. 4 ref. (P11)

381-P. Domain Structures Suggest Key to Enigma of Magnetic Force. C. D. Graham, Jr. *Journal of Metals,* v. 7, Sept. 1955, p. 948-951.

Knowledge of effects of metallurgical structure on domain behavior should make it possible to predict structure required to produce magnetic properties needed for particular application. Micrographs, diagrams. 5 ref. (P16, Fe)

382-P. Thermodynamic Properties of the Alkali Metals. William H. Evans, Rosemary Jacobson, Thomas R. Munson and Donald D. Wagman. *Journal of Research, National Bureau of Standards,* v. 55, Aug. 1955, p. 83-96.

Tabular data for values of free-energy and heat-content functions, entropy, heat content and capacity, heat of formation, free energy of formation and logarithm of equilibrium constant of formation. Tables. 98 ref. (P12, Cs, Rb, K, Na, Li)

383-P. Hall Effect in Permalloys. Simon Foner. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1079-1081.

Measurements of 25 and 55% iron in nickel are compared with recent results for some cobalt-nickel and iron-nickel alloys. Graphs. 10 ref. (P15, Ni, Fe, Co)

384-P. Thermal Conductivity of Germanium at Ambient Temperatures. Kathryn A. McCarthy and Stanley S. Ballard. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p.1104.

Conductivity of high-purity germanium was measured from 5 to 95° C., employing a technique developed for small samples of poorly conducting materials. Graph. 5 ref. (P11, Ge)

385-P. Electron-Phonon Interaction in Metals. John Bardeen and David Pines. *Physical Review,* v. 99, ser. 2, Aug, 15, 1955, p. 1140-1150.

Role of electron-electron interactions investigated by extending Bohm-Pines collective description to account for ionic motion. 19 ref. (P15)

386-P. Intrinsic Optical Absorption in Single-Crystal Germanium and Silicon at 77°K and 300°K. W. C. Dash and R. Newman. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1151-1155.

Threshold for indirect and direct transitions of both metal types. Graphs. 10 ref. (P17, Ge, Si)

387-P. Surface Barrier Analysis for Metals by Means of Schottky Deviations. D. W. Juenker. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1155-1160.

Transmission coefficient for mirror-image barrier is applied to photoelectric emission. Graphs. 7 ref. (P15)

388-P. Pressure Dependence of de Haas-van Alphen Parameters in Bismuth. W. C. Overton, Jr., and Ted G. Berlincourt. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1165-1169.

Hall coefficient of single crystal has been measured at 4.2°K., in magnetic fields up to 12 kg. and under liquid helium pressures up to 120 atmos. Graphs, diagrams, table. 20 ref. (P15, Bi)

389-P. Properties of Grain Boundaries in Gold-Doped Germanium. A. G. Tweet. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1182-1189.

Below 100° K., these boundaries produce a path of relatively low electrical resistance. New permanent magnet for measuring Hall effect in semiconductors at low temperatures. Diagrams, graphs. 16 ref. (P15, Ge, Au)

390-P. Gyromagnetic Ratio of Iron at Low Magnetic Intensities. G. G. Scott. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1241-1244.

Measured value for the ratio of pure iron, as determined by a direct magneto-mechanical method, undergoes a change for low values of the induced magnetic intensities. Tables, graph. 4 ref. (P16, Fe)

391-P. Electrical Properties of Plastically Deformed Germanium. A. G. Tweet. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1245-1248.

Study of antimony- and gold-doped germanium, deformed at 550 to 620° C., show production of acceptor centers. Graphs. 14 ref. (P15, Q24, Ge)

392-P. Ferromagnetic Hall Coefficient of Nickel Alloys. Albert I. Schindler and Edward I. Salkovitz. *Physical Review,* v. 99, ser. 2, Aug. 15, 1955, p. 1251-1252.

Karplus-Luttinger theory indicates that coefficient is related to square of electrical resistivity. Table, graph. 9 ref. (P16, Ni)

393-P. The Phase Transition in Superconductors. IV. Aluminium. T. E. Faber. *Royal Society, Proceedings,* v. 231, ser. A, Sept. 6, 1955, p. 353-367.

Extends the comparison between the behavior of superconducting aluminum and tin, at high frequencies, to the surface tension which acts on any boundary dividing the superconducting from the normal phase. Graphs, table, diagram. 14 ref. (P10, P15, Al)

394-P. The Penetration Depth and High-Frequency Resistance of Superconducting Aluminium. T. E. Faber and A. B. Pippard. *Royal Society, Proceedings,* v. 231, ser. A, Sept. 6, 1955, p. 336-353.

Measurements of the surface resistance and reactance, at a frequency of 1200 Mc. per sec., indicates it may be highly anisotropic. Its average value at 0° K. may be taken to be 4.9 x 10^{-6} cm., which is close to the value found for tin. Graphs. 24 ref. (P15, Al)

395-P. The Physical Properties of Sintered Zirconium. Herbert S. Kalish, Henry H. Hausner and Roswell P. Angler. *Sylvania Electric Products, Inc. (U. S. Atomic Energy Commission),* SEP-44, Mar. 1951, 32 p.

It is shown that zirconium is suitable for powder metallurgical application and that zirconium hydride powder, in fabrication techniques, has advantages over zirconium powder. Tables, graphs, micrographs. 15 ref. (P general, H general, Zr)

396-P. Influence of Impurities and Imperfections on the Electrical Properties of Metals. J. S. Koehler. Paper from "Impurities and Imperfections". American Society for Metals, p. 162-169.

Considers point imperfections, influence of dislocations and stacking faults, and effects of grain boundaries and precipitates. Table. 22 ref. (P15, M26)

397-P. Effects of Impurities and Imperfections in Semiconductors. J. A. Burton. Paper from "Impurities and Imperfections". American Society for Metals, p. 186-199.

Important semiconductor properties for transistor applications and how these properties are influenced by chemical impurities and imperfections. Diagrams, tables, graphs. 59 ref. (P15, M26, Ge, Si)

398-P. (English.) **Diamagnetism in Metals.** Lars Onsager. Paper from "International Conference of Theoretical Physics, Proceedings". Organizing Committee, International Conference of Theoretical Physics, Science Council of Japan, p. 669-675; disc., p. 676.

Various theories to explain observed phenomena. Graphs. 20 ref. (P16)

399-P. (English.) **On Diamagnetism of Metals.** Rudolf E. Peierls. Paper from "International Conference of Theoretical Physics, Proceedings." Organizing International Conference Committee of Theoretical Physics, Science Council of Japan, p. 676-677; disc., p. 678.

Theoretical solution of a wave equation gives greater conformity with observed data than use of quantum theory. 2 ref. (P16)

400-P. (English.) **Problem of Ferromagnetism.** John C. Slater. Paper from "International Conference of Theoretical Physics, Proceedings". Organizing Committee, International Conference of Theoretical Physics, Science Council of Japan, p. 679-691; disc., p. 691-693.

Explains ferromagnetism on the basis of the energy band functions or molecular orbitals. Graph. (P16)

401-P. (French.) **Study of Thermoelectric Properties of Aluminum in Very Thin Lamellae.** Jean-Jacques Savornin and France Savornin. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 339-340.

Measurements are made on thin lamellae of super purity aluminum coupled to copper. Diagram, graph, table. (P15, Al, Cu)

402-P. (German.) **On the Causes of Permeability Changes Due to Cooling of Magnetic Field in Iron-Silicon Monocrystals.** H. Fahlenbrach. *Technische Mitteilungen Krupp,* v. 13, no. 4, Aug. 1955 p. 84-95.

Measurement of virgin magnetization curves on iron-silicon alloys of different metallograpihc orientation with and without magnetic-field cooling; observation of elementary-range structure by Bitter-William's strip method. Graphs, micrographs. 16 ref. (P16, Fe, Si)

403-P. (German.) **Precision Measurements for the Heat of Fusion of Certain Metals.** Willy Oelsen, Olaf Oelsen and Dieter Thiel. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 555-560.

Evaluation of the method for indium, thallium, tin, cadmium, lead, zinc, aluminum and antimony; heat of transformation of thallium. Graph, diagram, tables. 15 ref. (P12, In, Tl, Sn, Cd, Pb, Zn, Al, Sb)

404-P. Total Normal Emissivity Measurements on Aircraft Materials Between 100 and 800° F. N. W. Snyder, J. T. Gier and R. V. Dunkle. *ASME, Transactions,* v. 77, Oct. 1955, p. 1011-1019.

Test methods and results. Data presented are useful aids as a phase of the technique of evaluation of equilibrium temperatures of different surfaces exposed to solar ir-

radiation. Diagrams, graphs, table. 7 ref. (P17)

405-P. Thermal Conductivity and Its Variability With Temperature and Pressure. L. S. Kowalczyk. *ASME, Transactions,* v. 77, Oct. 1955, p. 1021-1035.

Present status of theory of thermal conductivity, its variability with temperature and pressure explained by means of nature of heat, structure of matter and resistances offered by matter to heat conduction at various physical states. Tables, diagram, graphs. 52 ref. (P11)

406-P. Effect of Fluorides and Other Addition Agents on the Cathodic Potential of Titanium in Hydrofluoric Acid. M. E. Straumanis, S. T. Shih and W. W. Schlechten. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 573-576.

Absolute hydrogen overvoltage values increase or cathodic potentials decrease when alkali fluorides and organic colloid solutions of agar-agar or arabic gum are added; methylene blue increases potentials. Graphs. 16 ref. (P15, Ti)

407-P. Electrokinetic Potentials of Bulk Metals by Streaming Current Measurements. I. Method. Ray M. Hurd and Norman Hackerman. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 594-597.

Experimental data prove validity of measuring currents developed by fluid flow through metal capillaries. Graphs, diagrams. 4 ref. (To be continued.) (P15)

408-P. Liquid Metal Heat Transfer. W. B. Hall. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/417, June 1955, 16 p.

Considers fluids with low Prandtl number. Shows significant variations in temperature around annuli carrying liquid metal in heat exchanger. Diagrams, graphs. 6 ref. (P11)

409-P. Effect of Nitrides on the Coercive Force of Iron. J. Kerr and C. Wert. *Journal of Applied Physics,* v. 26, Sept. 1955, p. 1147-1151.

Results are in agreement with those reported for effect of carbides. Graphs, micrographs. 10 ref. (P16, Fe)

410-P. Thermal Expansion and Phase Transformations of Low-Expanding Cobalt-Iron-Chromium Alloys. Peter Hidnert and Richard K. Kirby. *Journal of Research, National Bureau of Standards,* v. 55, July 1955, p. 29-37.

Study between −65 and +800° C. covers effects due to temperature, chemical composition and heat treatment. Tables, graphs, micrographs. 10 ref. (P11, N6, Co, Fe, Cr)

411-P. The Infra-Red Properties of Some Metallic Films. J. N. Hodgson. *Physical Society, Proceedings,* v. 68, no. 429B, Sept. 1955, p. 593-602.

Measured for evaporated films of gold, silver, copper, zinc, tin and aluminum. Graphs. 15 ref. (P17, Au, Ag, Cu, Zn, Sn, Al)

412-P. The Direct Separation of the Reversible and Irreversible Components of the Magnetothermal Effect. L. F. Bates and N. P. R. Sherry. *Physical Society, Proceedings,* v. 68, no. 429B, Sept. 1955, p. 642-648.

Method carries out small backward increments in magnetization at given points on hysteresis cycle. Graphs. 8 ref. (P16, Co)

413-P. Application of Chemical Thermodynamics to the Study of Alloy Formation. W. E. Wallace, R. S. Craig, W. V. Johnston, G. S. Kamath, K. F. Sterrett, T. R. Waite and M. G. Zabetakis. *University of Pittsburgh, (U. S. Atomic Energy Commission),* NYO-6327, July 1955, 5 p.

With the aid of recent heat capacity measurements on $MgCd_3$ and Mg_3Cd the heats, entropies and free energies for formation of these alloys at 25° C. were computed. Thermal conductivities of $MgCd_3$, MgCd and Mg_3Cd from 80 to 300° K. determined. Table. 3 ref. (P12, Mg, Cd)

414-P. (French.) **Magnetic Susceptibilities of the Gallium Crystal and Liquid Gallium.** André Marchand. *Comptes rendus,* v. 241, no. 5, Aug. 1, 1955, p. 468-470.

Determination of the principal susceptibilities of the gallium crystal between 80 and 290° K., and liquid gallium at 40° C. Graph, table. 6 ref. (P16, Ga)

415-P. (French.) **Ferromagnetic Resonance of Gadolinium Ferrites as a Function of Temperature, at 9000 Mc. per Sec.** Jean Paulevé. *Comptes rendus,* v. 241, no. 6, Aug. 8, 1955, p. 548-550.

Study of phenomena of ferromagnetic resonance of ferrite in a range of temperatures around 306° K. Graphs. 5 ref. (P16, Gd, Fe)

416-P. (French.) **Properties of the Boron-Aluminum Semiconductor Compounds.** J. Lagrenaudie. *Journal de chimie physique,* v. 52, no. 1, Jan. 1955, p. 34-37 + 1 plate.

High-temperature resistance and low-temperature conductance of AlB_{12}. Current-voltage characteristics and photoelectric effects of Wöhler's aluminum-boron carbides. Micrograph, graphs. 10 ref. (P15, B, Al)

417-P. (German.) **Thermodynamic Analysis. III. Automatic Indication of Enthalpy Curves of Metals and Alloys.** Willy Oelsen. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 519-522.

Method of recording enthalpy of metals and alloys from colorimetric measurement, with examples for indium, tin, bismuth, thallium, cadmium and lead. Graphs, photographs, table. 6 ref. (P12, In, Sn, Bi, Ti, Cd, Pb)

418-P. (German.) **Dependence of Magnetic Reversal Losses of Hot Rolled Transformer Sheets on the Annealing Condition.** Franz Lihl and Paul Zemsch. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 535-540.

Results of investigation of the magnetic reversal losses in a 0.4-mm. thick sheet with 4.3% silicon, and 0.25% aluminum content, also presence of nonmetallic inclusion in the tested metal sheet at temperatures from 800 to 1200° C. Tables, micrographs, graphs. (P16, J23, AY)

419-P. (German.) **Measuring the Magnetic Permeability of Metals by Means of Hollow Resonator and the Permeability of Iron in the Region of Ferromagnetic Resonance.** K. Helmut Reich. *Frequenz,* v. 9, no. 9, Sept. 1955, p. 299-305.

Cause of dependence of magnetic permeability on frequency; method and operating instructions; discussion of obtained data from practical and theoretical viewpoints. Graphs. 4 ref. (To be continued.) (P16, Fe)

420-P. (German.) **Practical Limitations in Electrical Measurements Caused by Metallic Material. II. Influence of Metallic Materials on Measurement Inaccuracy.** R. Ennulat. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 758-763.

Influence of properties of metals used in electrical measuring instruments on the accuracy of the instruments. Tables, photographs, diagram, graphs. 8 ref. (P15, P16, T8)

421-P. (German.) **New Experimental Results in the Field of Superconductivity.** Werner Buckel. *Naturwissenschaften,* v. 42, no. 16, Aug. 1955, p. 451-458.

Superconducting components produced from non-superconducting metallic elements giving their transition temperature, the change of physical properties under superconductivity, the isotopic effect and the influence of pressure and lattice distortion on the characteristic superconducting properties. Micrographs, graphs, table. 125 ref. (P15)

422-P. (German.) **Superconduction and the Electrical Resistance of Condensed Bismuth Layers.** Nikolaus Barth. *Zeitschrift für Physik,* v. 142, no. 1, 1955, p. 58-69.

Investigation in which stabilization of bismuth superconductivity, by introducing different inclusion, has been successfully carried out up to 200° K. Graphs. 20 ref. (P15, Bi)

423-P. (Russian.) **Paramagnetic Properties of Austenitic Alloys With Varying Chromium Content.** V. I. Proskvirin and S. Ia. Sigolaev. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 7, July, p. 96-100.

Chemical composition of specimens used. Equipment and determination of magnetic susceptibility, influence of quenching temperature, hysteresis of magnetic susceptibility of austenite. Table, graphs. 1 ref. (P16, AY)

424-P. (Russian.) **Theory of Electrical Conductivity of Metals.** P. S. Zyrianov. *Zhurnal eksperimental'noi i teoreticheskoi fiziki,* v. 29, no. 2, Aug. 1955, p. 193-200.

Calculating the fluctuations of the potential within an electrical field in an electronic-ionic plasma of the metal and the electrical resistance brought about by the scattering of electrons. 13 ref. (P15)

425-P. (Book—English.) **International Conference of Theoretical Physics,** *Proceedings.* 942 p. 1954. Organizing Committee, International Conference of Theoretical Physics, Science Council of Japan, Ueno Park, Tokyo, Japan.

Reports on field theory, elementary particles, nuclear physics, statistical mechanics, crystal dislocations, and physical properties of metals. (P general, M26)

426-P. **Preparation and Electrical Properties of CdTe Single Crystals.** F. A. Kröger and D. de Nobel. *Journal of Electronics,* v. 1, ser. 1, Sept. 1955, p. 190-202.

Shows that the type of conduction can be changed by varying the proportion between cadmium and tellurium, an excess of cadmium over the

stoichiometric composition giving rise to *n*-type, and excess of tellurium to *p*-type conduction. Graphs, diagrams, tables. 8 ref.
(P15, N12, Cd, Te)

427-P The Preparation, Electrical and Optical Properties of Mg_2Sn. W. D. Lawson, S. Nielsen, E. H. Putley and V. Roberts. *Journal of Electronics,* v. 1, ser. 1, Sept. 1955, p. 203-211.

Single crystals prepared and examined optically and electrically in attempt to compare the thermal and optical activation energies. Graphs. 8 ref. (P17, P16, Mg, Sn)

428-P. The Coefficients of Thermal Expansion for Zirconium. R. B. Russell. *Massachusetts Institute of Technology (U. S. Atomic Energy Commision),* MIT-1073, Oct. 1951, 41 p.

Expansion coefficients of anisotropic (hexagonal) zirconium calculated from lattice parameters of an alloy containing 2.4% hafnium, from 0 to 600° C. Graphs, tables, photographs. 33 ref. (P11, Zr)

429-P. Study of Metal-Ceramic Interactions at Elevated Temperatures. F. H. Norton and W. D. Kingery. *Massachusetts Institute of Technology (U. S. Atomic Energy Commission),* NYO-4631, July 1955, 14 p.

Measurements of surface and interface energy in the system, liquid nickel-solid alumina, completed for small additions of tin, indium, chromium and titanium in liquid phase. Table, graphs.
(P12, Ni, Al, Ti, Cr, In, Sn)

430-P. The Adhesion of Amphipathic Molecules to Metal Surfaces. R. B. Waterhouse and J. H. Schulman. *Oil & Colour Chemists' Association, Journal,* v. 38, Oct. 1955, p. 646-651; disc., p. 651-654.

Structure and adhesion of simple molecules on copper, aluminum and iron surfaces studied by contact-angle measurements, coefficient-of-friction changes on rubbing metal surfaces, and electron-diffraction measurements on the deposited films. Graph, table. 7 ref.
(P13, L general, Fe, Al, Cu)

431-P. Effect of Point Imperfections on the Electrical Properties of Copper. I. Conductivity. F. J. Blatt. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1708-1716.

Changes in resistivity due to the addition of substitutional impurities and the presence of vacancies or interstitials. Table, graphs. 40 ref.
(P15, Cu)

432-P. Influence of Exchange and Correlation on Electric Transport in Metals. F. J. Blatt. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1735-1736.

Derivation of expressions relating electron energy to wave vectors. Table. 7 ref. (P15)

433-P. Precision Density Determination of Large Single Crystals by Hydrostatic Weighing. A. Smakula and V. Sils. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1744-1746.

Hydrostatic weighing method using ethylene bromide as the immersion liquid. Random and systematic errors. Accuracy of the order of 10^{-5} is reached. Tables, diagram. 26 ref. (P10)

434-P. Densities and Imprefections of Single Crystals. A. Smakula, J. Kalnajs and V. Sils. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1747-1750.

Densities of Si, Al, CaF_2, CsI, Ge, TlCl, TlBr and SiO_2 (quartz) computed from lattice constants and molecular weights obtained from International Atomic Weights, compared with densities as determined by hydrostatic weighting of large single crystals. Tables, graphs. 33 ref. (P10, M26)

435-P. Oscillatory Galvanomagnetic Properties of Antimony Single Crystals at Liquid Helium Temperatures. M. C. Steele. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1751-1759.

Measurements of Hall coefficient and transverse magnetoresistance in magnetic fields up to 25 kilogauss. Graphs, table. 14 ref.
(P15, P16, Sb)

436-P. Thermomagnetic Anisotropy. Jerome I. Kaplan. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1808-1810.

Solution of the Boltzmann transport equation in a solid given for applied electric and magnetic fields and a temperature gradient. 7 ref.
(P16, P15)

437-P. Electrical Properties of Germanium-Silicon Alloys. Alfred Levitas. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1810-1814.

Hall and resistivity measurements at 300 to 800° K. Graphs. 10 ref.
(P15, Ge, Si)

438-P. Effects of Stress on Superconducting Sn, In, Tl, and Al. Nils L. Muench. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1814-1820.

Hydrostatic pressures of 0 to 100 atmos. obtained with helium gas pressure, and of 1.9 x 10^3 atmos. obtained by an ice expansion bomb

technique used to measure pressure displacement of the critical temperature. Diagrams, graphs, tables. 20 ref. (P11, Sn, In, Tl, Al)

439-P. Gyromagnetic Ratio of Nickel at Low Magnetic Intensities. G. G. Scott. *Physical Review,* v. 99, ser. 2, Sept. 15, 1955, p. 1824-1825.

Extrapolated zero intensity value is 1.801. At a higher induced magnetic intensity, the effective value changes to 1.830. Tables, graph. 4 ref. (P16, Ni)

440-P. Shape and Crystal Anisotropy of Alnico 5. E. A. Nesbitt and H. J. Williams. *Journal of Applied Physics,* v. 26, Oct. 1955, p. 1217-1221.

It is concluded from torque measurements on single crystals that high coercive force depends on shape anisotropy of the fine precipitated plates and that the crystal anisotropy is negligible. Graphs, micrographs. 6 ref. (P16, M26, SG-n)

441-P. On Representation of Electromagnetic Fields in Cavities in Terms of Natural Modes of Oscillation. S. A. Schelkunoff. *Journal of Applied Physics,* v. 26, Oct. 1955, p. 1231-1234.

When expressing admittance of a cavity excited through a hole in terms of frequencies that can exist when cavity is short-circuited, the short-circuit must conform to the impressed field. Diagrams. 6 ref. (P16)

442-P. Effect of Water Vapor on Grown Germanium and Silicon *np* Junction Units. J. T. Law and P. S. Meigs. *Journal of Applied Physics,* v. 26, Oct. 1955, p. 1265-1273.

Investigation of effect on photoresponse curves and reverse current characteristics. Tables, graphs. 14 ref. (P15, Ge, Si)

443-P. Permanent-Magnet Properties of Elongated Single-Domain Iron Particles. L. I. Mendelsohn, F. E. Luborsky and T. O. Paine. *Journal of Applied Physics,* v. 26, Oct. 1955, p. 1274-1280.

Shape anisotropy overcomes limitation imposed on energy of other fine-particle iron magnets by low crystal anisotropy of iron. Tables, micrographs, graphs. 30 ref. (P16, Fe)

444-P. Diffusion Effects in Magnetic Resonance of the Alkali Metals. C. P. Slichter. Paper from "Defects in Crystalline Solids". The Physical Society, p. 52-59, disc., p. 424-425.

Characteristics of lithium, sodium and rubidium at different temperatures and in independent static field fluxes. Graphs. 13 ref. (P16, M26, N1, Li, Na, Rb)

445-P. (Russian.) **Photoelectric Effect in Metals.** S. V. Vonsovskii, A. V. Sokolov and A. Z. Veksler. *Uspekhi fizicheskikh nauk,* v. 56, no. 4, Aug. 1955, p. 477-530.

Premises for constructing quantum theory of photo-electric effect, and Fauler's quasi-phenomenological theory; quantum-mechanical theory of the photo-electric effect in metals; surface photo-electric effect in ordered alloys and ferromagnetic metals. Graphs. 65 ref. (P15)

446-P. (Russian.) **Mechanism of Hydrogen Overvoltage on Nickel, Platinum, and Other Metals.** P. D. Lukovtsev and S. D. Levina. *Zhurnal fizicheskoi khimii,* v. 29, no. 8, Aug. 1955, p. 1508-1512.

Corrections of and additions to previous equations concerning this phenomenon. 35 ref. (P15, Ni, Pt, Pb, Co, Fe, Pd)

447-P. (Russian.) **Synthesis and Properties of Columbium Bronzes.** E. I. Krylov and A. A. Sharnin. *Zhurnal obshchei khimii,* v. 25, no. 9, Sept. 1955, p. 1680-1685.

Chemical formulas, crystal lattice, colors of compounds, magnetic sensitivity of bronzes, electrical resistance of powder at different pressures. Tables. 10 ref. (P general, M26, Cu)

448-P. (Spanish.) **General View of the Electrochemical Behavior of Metals. II.** Marcel Pourbaix. *Instituto del hierro y del acero,* v. 8, no. 36, Apr.-June 1955, p. 124-135.

Study of the behavior of iron in the presence of solutions free of oxidizing agents and with oxygen; differential aeration of iron; behavior of iron in contact with another metal. Diagrams, graphs, tables. 14 ref. (P15, Fe)

449-P. The Electrochemical Behavior of the Tungsten Electrode and the Nature of the Different Oxides of the Metal. S. E. S El Wakkad, H. A. Rizk and I. G. Ebaid. *Journal of Physical Chemistry,* v. 59, Oct. 1955, p. 1004-1008.

It has been found possible to define clearly the *p*H range over which the electrode functions properly. Anodic oxidation at low current density is studied. Graphs. 9 ref. (P13, P15, W)

450-P. On the Melting Point of Germanium. F. X. Hassion, C. D. Thurmond and F. A. Trumbore. *Journal of Physical Chemistry,* v. 59, Oct. 1955, p. 1076-1078.

Experiments indicate the best value to be 937.2 + 0.5° C. Freezing points determined from cooling curves on germanium melts under

high vacuum, in contact with GeO_2 or exposed to hydrogen, helium, argon or nitrogen atmospheres. Table. 20 ref. (P12, Ge)

451-P. Optical Constants of Metals in the Infra-Red—Conductivity of Silver, Copper and Nickel. J. R. Beattie and G. K. T. Conn. *Philosophical Magazine,* v. 46, 7th ser., no. 380, Sept. 1955, p. 989-1001.

Attention given to preparation of surfaces, including hand and electrolytically polished, and those obtained by evaporating *in vacuo*. Graphs, tables. 16 ref. (P17, Ni, Cu, Ag)

452-P. Ferromagnetic Resonance in Nickel and in Some of Its Alloys. K. J. Standley and K. H. Reich. *Physical Society, Proceedings,* v. 68, no. 430B, Oct. 1955, p. 713-722.

From microwave measurements, *g* values and line widths for nickel and its alloys containing copper, aluminum, antimony and manganese were determined. Tables, graphs. 19 ref. (P16, Ni)

453-P. The General Motion of Conduction Electrons in a Uniform Magnetic Field, With Application to the Diamagnetism of Metals. P. G. Harper. *Physical Society, Proceedings,* v. 68, no. 430A, Oct. 1955, p. 879-892.

From translational properties of the Hamiltonian, a standard form is derived for wave functions. 11 ref. (P16)

454-P. (Czech.) **Physical Properties of Spheroidal Cast Iron.** Frantisek Kohl. *Slévarenstvi,* v. 3, no. 9, Sept. 1955, p. 265-269.

Modulus of elasticity, damping capacity, magnetic and electric values compared with physical properties of gray and inoculated cast irons. Spheroidal cast iron is recommended instead of gray iron for electrical products. Micrographs, tables, graphs. 2 ref. (P15, P16, Q21, Q8, CI)

455-P. (Czech.) **A New Method of Measuring the Tendency for the Development of Shrinkage-Cavities.** Vaclav Oliverius and Josef Vaculik. *Slévarenstvi,* v. 3, no. 9, Sept. 1955, p. 269-272.

Describes and compares new test technique. Tables, diagrams, photographs. (P10, E25, Al, CI)

456-P. (German.) **The Stability of Guinier-Preston Zones in Aluminum-Copper Alloys.** Hermann Franz and Ekkehart Kröner. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 639-646.

Distortion energy in the passage from G.P.I. to G.P. II, effect of change energy of co-axial dislocation rings. Graphs. 12 ref. (P12, Al, Cu)

457-P. (Russian.) **Thermodynamic Theory of Magnetic Relaxation.** G. R. Khutsishvili. *Zhurnal eksperimental'noi i teoreticheskoi fiziki,* v. 29, no. 3, Sept. 1955, p. 329-333.

Uses the principle of symmetry of kinetic coefficients to find relationship of magnetization and internal temperature of spin-system to time. Conditions under which internal spin-equilibrium is attained more quickly than the equilibrium of the spin-system with lattice. 5 ref. (P16)

458-P. (Russian.) **Effect of the Demagnetization Method in a Nickel Specimen on the Temperature Dependence of the Magnetized State in Weak Fields.** A. I. Drokin and V. L. Il'iushenko. *Zhurnal eksperimental'noi i teoreticheskoi fiziki,* v. 29, no. 3, Sept. 1955, p. 339-344 + 1 plate.

Two methods for studying the effect; description of the astatic magnetometer. Circuit diagrams, graph, tables. 10 ref. (P16, Ni)

459-P. (Russian.) **Photoelectric Properties of Some Compounds With the Zinc Blende Structure.** N. A. Goriunova, V. S. Grigor'eva, B. M. Knovalenko and S. M. Ryvkin. *Zhurnal tekhnicheskoi fiziki,* v. 25, no. 10, Sept. 1955, p. 1675-1682.

Investigation conducted with gallium, indium and tellurium alloys. Tables, graphs. 8 ref. (P15, Ga, In, Te, Zn)

460-P. (Pamphlet.) **Physical and Mechanical Properties of Mallory Sharon Titanium Alloys.** 13 p. 1955. Mallory-Sharon Titanium Corp., Niles, Ohio.

Complete resume of each Mallory-Sharon titanium alloy. (P general, Q general, Ti)

SECTION Q

MECHANICAL PROPERTIES and TEST METHODS; DEFORMATION

1-Q. Some Metallographic Observations on the Fatigue Failure of 24S-T and Al-Clad 24S-T Alloy Sheet. J. J. Sebisty and J. O. Edwards. *Canada Department of Mines and Technical Surveys, Mines Branch Research Report* PM164, May 11, 1954, 45 p. + 14 plates.

Evaluation of crack damage, variation of deformation with stress level and fatigue data. Tables, diagrams, micrographs, graphs. 7 ref. (Q7, Al)

2-Q. Effect of Subcritical Cooling Rate on the Brittle-Fracture Characteristics of Structural Steel. L. Mair. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1206-1207.

Effects of cooling rate below 1200° F. after hot rolling on brittleness of 1020 steel plate. Table, graph. 2 ref. (Q26, Q23, CN)

3-Q. Strain Hardening of Latent Slip Systems in Zinc Crystals. E. H. Edwards and Jack Washburn. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1239-1242.

Anisotropic strain hardening occurred during simple shear due to formation of dislocation barriers. Diagram, photograph, graphs. 8 ref. (Q24, Zn)

4-Q. Mechanical Properties of Alpha Titanium as Affected by Structure and Composition. R. I. Jaffee, F. C. Holden and H. R. Ogden. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1282-1290.

Data for nitrogen and aluminum alloys. Increasing grain size decreases strength and hardness and increases impact resistance. Precipitation found in high-nitrogen alloys. Tables, micrographs, graphs. 11 ref. (Q23, Q29, Q6, N3, Ti)

5-Q. Temper Embrittlement of 5140 Steel. S. H. Bush and C. A. Siebert. *Journal of Metals,* v. 6, Nov. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Nov. 1954, p. 1269-1271.

Isothermal studies at various temperatures for times up to 3000 hr. Hardness, impact strength and structures were determined. Table, micrographs. 7 ref. (Q23, AY)

6-Q. High-Strength Steel. R. L. Brickley and D. M. S. Peckner. *Machine Design,* v. 26, Nov. 1954, p. 208-212.

Obtaining accurate mechanical property data provides simple method for statistical determination of actual yield-point variation. Tables, graph. 3 ref. (Q27, AY)

7-Q. Beams With Nonuniform Loading. F. C. Bragg. *Machine Design,* v. 26, Nov. 1954, p. 213-216.

Determination of reactions at beam supports. Tables, diagrams, graphs. (Q28)

8-Q. The Cause of Temper Brittleness in Steel. A. M. Sage. *Metal Treatment and Drop Forging,* v. 21, Oct. 1954, p. 463-468.

Assessment of present knowledge. Characteristics of elements causing or reducing susceptibility. Graphs, micrograph, tables. 16 ref. (Q23, ST)

9-Q. (Russian.) **Influence of Alloying Additions on the Temperature Dependence of the Shear Modulus of Iron.** N. S. Rysina and B. N. Finkel'shtein. *Doklady Akademii Nauk SSSR,* v. 98, no. 2, Sept. 11, 1954, p. 215-217.

Comparison of temperature-shear modulus curves for iron plus vanadium, molybdenum, cobalt and manganese, in the range of 20 to 760° C. Graph, table. 3 ref. (Q21, Fe)

10-Q. Twinned Crystals. R. W. Cahn. *Advances in Physics,* v. 3, Oct. 1954, p. 363-445.

Types and nature of twinning, growth and transformation twinning, deformation twinning. Diagrams, tables. 240 ref. (Q24)

11-Q. Energy Theorems and Structural Analysis. I. General Theory. J. H. Argyris. *Aircraft Engineering,* v. 26, Oct. 1954, p. 347-356.

Application of principles of virtual displacements and virtual forces. Diagrams, graphs. 13 ref. (To be continued.) (Q25)

12-Q. Tension Specimens Made by Photoengraving Technique. Ralph L. Dowdell and William B. F. Mackay. *ASTM Bulletin,* 1954, no. 201, Oct., p. 65-66.

Preparation of very thin and flat specimens. Photograph. 3 ref. (Q27)

13-Q. Recent Advances in Theories of Creep of Engineering Materials. Folke K. G. Odqvist. *Applied Mechanics Reviews,* v. 7, Dec. 1954, p. 517-519.

Refinements in theoretical treatment of primary creep. Graphs. 18 ref. (Q3)

14-Q. The Influence of Surface Rolling on the Fatigue Properties of Flake Graphite and Nodular Graphite Cast Irons. G. N. J. Gilbert and K. B. Palmer. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Oct. 1954, p. 447-464 + 2 plates.

Increases in fatigue limits of 20% for flake graphite and over 190% for nodular irons obtained on 45° V-notched specimens. Tables, micrographs, photographs, diagrams. 2 ref. (Q7, CI)

15-Q. Recent Research on Pressure Vessels. *Chemical Age,* v. 71, Nov. 13, 1954, p. 1031-1038.

Sources of weakness, types of failure. Recent research on strain measurement and design. Photographs, graphs. (Q25, CN)

16-Q. Stress Concentrations at Holes in Rotating Discs. H. G. Edmunds. *Engineer,* v. 198, Nov. 5, 1954, p. 618-620.

Results of tests made between 1947 and 1950, using the frozen stress technique, based on the photo-elastic investigation of Teverovsky in 1940. Graphs, stress patterns, photograph, diagram, table. (Q25)

17-Q. Three-Dimensional Stress Functions. H. L. Langhaar and M. Stippes. *Franklin Institute, Journal,* v. 258, Nov. 1954, p. 371-382.

Compatibility equations for an isotropic Hookean body subjected to boundary stresses and temperature gradients in terms of Maxwell stress functions; general solution for steady temperature fields. 6 ref. (Q25)

18-Q. Magnetic Measurement of Mechanical Hardness. D. Hadfield. *Institution of Electrical Engineers, Proceedings,* v. 101, pt. 2, no. 83, Oct. 1954, p. 529-535; disc., p. 535-540.

New method for the nondestructive measurement of the mechanical hardness of ferromagnetic components, based on the relationship between a "coefficient of magnetic hardness" and the variables in the upper portion of the magnetization curve. Graphs, tables, diagrams. 8 ref. (Q29, P16, ST)

19-Q. Influence of Cold Deformation on the Young's Modulus of Some Non-Ferrous Metals. Maurice Cook, T. Ll. Richards and G. F. Bidmead. *Institute of Metals, Journal,* v., 83, Oct. 1954, p. 41-47.

Young's modulus values for copper, brass and aluminum correlated with microstructures and X-ray data. Tables, graphs. 10 ref. (Q21, Cu, Al)

20-Q. Twinning and Untwinning in Polycrystalline Magnesium. R. L. Woolley. *Institute of Metals, Journal,* v. 83, Oct. 1954, p. 57-58 + 1 plate.

Stress-strain curves for repeated shear with strain amplitudes less than 10%. Graph, micrographs. (Q24, Mg)

21-Q. The Creep and Fatigue Properties of Some Wrought Complex Aluminium Bronzes. J. McKeown, D. N. Mends, E. S. Bale, and A. D. Michael. *Institute of Metals, Journal,* v. 83, Nov. 1954, p. 69-79 + 2 plates.

Tests at 300 to 400° C. indicate alloys with 3 to 7% aluminum are best. Corrosion-fatigue resistance is better than stainless steel. Graphs, tables, diagram, micrographs. 5 ref. (Q3, Q7, R1, Cu, Al)

22-Q. The Effect of Strain Rate and Temperature on the Resistance of Aluminium, Copper, and Steel to Compression. J. F. Alder and V. A. Phillips. *Institute of Metals, Journal,* v. 83, Nov. 1954, p. 80-86 + 1 plate.

Tests to 50% reduction of height at −190 to 550° C. for aluminum, from 18 to 900° C. for copper, and from 930 to 1200°. C. for 0.17% carbon steel. Tables, graphs, diagram, photograph. 28 ref. (Q28, Al, Cu, CN)

23-Q. Strain-Ageing in 70:30 Brass. B. B. Hundy. *Institute of Metals,*

Journal, v. 83, Nov. 1954, p. 115-116.

Observations during room temperature tensile tests at various testing rates and rest periods. Graphs. 6 ref. (Q23, Cu, Zn)

24-Q. Uses of Resistance Wire Type Strain Gages in Steel Plants. W. A. Black. *Iron and Steel Engineer,* v. 31, Nov. 1954, p. 57-63.

Stress and load analysis of mill equipment. Diagrams, photographs, graphs. (Q25)

25-Q. A Statistical Study of the Creep and Fatigue Properties of a Precision-Cast High-Temperature Alloy. G. T. Harris and H. C. Child. *Iron and Steel Institute, Journal,* v. 178, Nov. 1954, p. 284-290.

Mechanical properties at room temperature and 700 to 850° C. of a cobalt-nickel-chromium, iron alloy. Tables, graphs, photograph. 5 ref. (Q3, Q7, Co, Ni, Cr, Fe)

26-Q. On Structural Fatigue Under Random Loading. John W. Miles. *Journal of the Aeronautical Sciences,* v. 21, Nov. 1954, p. 753-762.

Problems of fluctuating loads induced by a jet, which result in possible fatigue failure of aircraft structural components, aided by the stress spectrum and "equivalent fatigue stress". Graphs, diagrams. 20 ref. (Q7)

27-Q. On Inelastic Thermal Stresses in Flight Structures. Alfred M. Freudenthal. *Journal of the Aeronautical Sciences,* v. 21, Nov. 1954, p. 772-778.

Effect of inelastic behavior on the level of thermal stresses with constant and temperature-dependent parameters and importance of design for such stresses. Graph. 10 ref. (Q25)

28-Q. Influence of Deuteron Bombardment and Strain Hardening on Notch Sensitivity of Mild Steel. Robert A. Meyer. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1369-1374.

Schnadt-type impact specimens of SAE 1019 steel irradiated with 18.6-m.e.v. deuterons. Table, graphs, diagram. 26 ref. (Q6, CN)

29-Q. Theory of Stress-Strain Relations in Anisotropic Visco-Elasticity and Relaxation Phenomena. M. A. Biot. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1385-1391.

Thermodynamic derivation given for the representation of a system having visco-elastic or relaxation properties by means of a potential and dissipation function. (Q21, Q27)

30-Q. A Theory of the Plastic Yielding Due to Bending of Cantilevers and Fixed-Ended Beams. I. A. P. Green. *Journal of the Mechanics and Physics of Solids,* v. 3, Oct. 1954, p. 1-15.

Effects of weak-end support and axial loading in addition to vertical loading on an isotropic plastic-rigid material. Diagrams, tables, graphs. 18 ref. (Q5)

31-Q. A Determination of Plastic Stress-Strain Relations. B. B. Hundy and A. P. Green. *Journal of the Mechanics and Physics of Solids,* v. 3, Oct. 1954, p. 16-21.

Plastic potentials of copper, zinc and stainless steel determined by notched tensile specimens. Diagrams, table, graph. 10 ref. (Q27, Cu, Zn, SS)

32-Q. The Dynamic Straining of Metals Having Definite Yield Points. D. B. C. Taylor. *Journal of the Mechanics and Physics of Solids,* v. 3, Oct. 1954, p. 38-46.

Analysis of strain rate during non-uniform yielding. Equation for dynamic yield criterion. Graphs, table. 7 ref. (Q27, ST)

33-Q. The Yield of Mild Steel Under Impact Loading. J. D. Campbell. *Journal of the Mechanics and Physics of Solids,* v. 3, Oct. 1954, p. 54-62.

Dynamic stress-strain curve indicates yield stresses are about double static values. Diagram, graphs. 11 ref. (Q6, CN)

34-Q. An Experimental Study of Biaxial Stress-Strain Relations in Plasticity. P. M. Naghdi and J. C. Rowley. *Journal of the Mechanics and Physics of Solids,* v. 3, Oct. 1954, p. 63-80.

Data for ten tubular 24S-T4 specimens. Photographs, diagram, graphs. 16 ref. (Q27, Al)

35-Q. Finite Plane Strain for Orthotropic Bodies. A. E. Green and E. W. Wilkes. *Journal of Rational Mechanics and Analysis,* v. 3, Nov. 1954, p. 713-723.

Flexure of a cuboid solved in terms of a general strain energy function. 5 ref. (Q27)

36-Q. Two New Aluminum Extrusion Alloys. *Materials & Methods,* v. 40, Nov. 1954, p. 90-91.

Mechanical properties and design strength comparisons. Tables, photograph. (Q general, Al)

37-Q. Pickling Chromium for Ductility. W. J. Kroll. *Metal Industry,* v. 85, Oct. 22, 1954, p. 345-346.

Review of work on ductility of chromium. Graph. 8 ref. (Q23, L12, Cr)

38-Q. Low-Alloy Ferritic Steels Checked for Turbine Wheel Service.

(Digest of "High-Temperature Properties of Four Low-Alloy Steels for Jet-Engine Turbine Wheels", by Arthur Zonder, Adron I. Rush and James W. Freeman; *WADC Technical Report* 53-277, Part I, Nov. 1953, 66 p.) *Metal Progress,* v. 66, Nov. 1954, p. 202, 204.

Data on tensile, rupture and total deformation properties at 1000 and 1100 and 1200° F. for four steels—SAE 4340, "17-22A"S, H-40 and C-422. (Q27, Q4, Q24, AY, SG-h)

39-Q. Ship Structural Members. VI. J. McCallum. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 71, Nov. 1954, p. 25-49.

Stress analysis of plates stiffened by flat bars. Diagrams, graphs. 6 ref. (Q25)

40-Q. Secondary Stresses in Buried High Pressure Pipe Lines. M. G. Spangler. *Petroleum Engineer (Management Edition),* v. 26, Nov. 1954, p. D6-D10, D12.

Primary sources are backfill and traffic loads. Stress magnitude in combination with stresses caused by internal fluid pressure. Diagrams, graphs, tables. 5 ref. (Q25)

41-Q. Damping Capacity of Materials. Alexander Yorgiadis. *Product Engineering,* v. 25, Nov. 1954, p. 164-170.

Analysis and evaluation of phenomenon in nonuniformly and uniformly stressed members. Graphs, diagrams, tables. 8 ref. (Q8)

42-Q. Scoring Characteristics of Bearing Metals. A. E. Roach. *Product Engineering,* v. 25, Nov. 1954, p. 171-175.

Results of survey covering relative score resistance of 38 bearing materials when run against steel; ratings to simplify choice of metal for given bearing use. Photographs, diagram, table. (Q9, T7, SG-m)

43-Q. The Optimum Design of Compression Surfaces Having Unflanged Integral Stiffeners. E. J. Catchpole. *Royal Aeronautical Society, Journal,* v. 58, Nov. 1954, p. 765-768.

Rapid determination of the optimum cross-sectional dimensions. Diagrams, graphs. 8 ref. (Q28)

44-Q. The Dynamic Lateral Instability of Beams. J. F. Davidson. *Royal Society, Proceedings,* v. 226, ser. A, Oct. 21, 1954, p. 111-128.

Analysis of the vibrations of a deep slender beam, bent to uniform curvature by invariant moments acting in a vertical plane which is also the plane of maximum stiffness. Graphs, tables. 11 ref. (Q23)

45-Q. Cast Ferrous Metals. II. What Physicals Can You Expect? III. What Are Their Performance Limits? T. E. Eagan. *Steel,* v. 135, Nov. 22, 1954, p. 112-114; Nov. 29, 1954, p. 80-82.

Factors influencing mechanical properties of iron and steel castings. (Q general, CI)

46-Q. Crack Propagation. Frederick Forscher. *Welding Journal,* v. 33, Nov. 1954, p. 579S-584S.

A modified Griffith's crack mechanism used to analyze reported data. A material property called "fracture toughness" is of major importance. Diagrams, photographs, graph. 16 ref. (Q26)

47-Q. (Czech.) **Mechanical and Physical Properties of Titanium-Stabilized Austenitic Chromium-Nickel Steel Castings.** Zdenek Eminger, Antonin Fiala and Jaroslav Slajs. *Hutnické Listy,* v. 9, no. 9, 1954, p. 514-523.

Effects of titanium on intercrystalline corrosion, mechanical properties and magnetization. Diagrams, graphs, tables, photograph. 11 ref. (Q general, P16, R1, SS)

48-Q. (Czech.) **Examination of Internal Stresses With X-Rays.** Petr Skulari. *Hutnické Listy,* v. 9, no. 9, 1954, p. 529-537.

Origin of internal stresses, X-ray techniques. Diagrams, diffractograms. 29 ref. (Q25)

49-Q. (French.) **Refractory Cast Steels.** *Fonderie,* 1954, no. 105, Oct., p. 4192-4196.

Corrosion resistance and high-temperature mechanical strength of pearlitic, ferritic and austenitic grades. Graphs, table. (Q23, R general, CI, SS)

50-Q. (French.) **Young's Modulus of Aluminum and Its Alloys as a Function of Temperature.** E. G. Stanford. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 674-678; disc., p. 678.

Variation of damping capacity with temperature and its use in study of recrystallization. Diagrams, graphs. (Q21, Q8, N5, Al)

51-Q. (French.) **Plasticity of Hexagonal Metals and Its Variation With Temperature.** S. F. Pugh. *Revue de métallurgie,* v. 51, no. 10, Oct. 1954, p. 683-692.

Plasticity is related to elastic constants. Changes in mode of deformation with temperature are related to relaxation processes. Graph, table, diagrams. 37 ref. (Q23, Zn, Cd, Mg, Ti, Zr, Hf, Be, U)

52-Q. (German.) **Aging Phenomena of Steam Boilers.** V. Jares. *Energie-*

technik, v. 4, no. 9, Sept. 1954, p. 412-413.

Causes of embrittling. Proposed prevention includes operating the boiler below 13 atmospheres or the use of aging-resistant sheet steel. Graphs. 2 ref. (Q23, N7, T25, CN)

53-Q. (German.) **Correlation Between Fracture Appearance and the Steep Slope of the Notched Bar Toughness-Temperature Curve of Soft Steels.** Heinz Kornfeld. *Stahl und Eisen,* v. 74, no. 23, Nov. 4, 1954, p. 1526-1536.

Statistical analysis of data for openhearth fine-grain and rimming steels, and Armco iron from −60 to 40° C. Tables, graphs, photographs. 5 ref. (Q6, CN, Fe)

54-Q. (German.) **A New Flow Analogy of Torsion.** E. Pestel. *Zeitschrift für angewandte Mathematik und Mechanik,* v. 34, nos. 8-9, Aug.-Sept. 1954, p. 322-323.

Mathematical relationship between behavior of a viscous liquid and the torsional behavior of a primatic bar. Diagram. (Q1)

55-Q. (German.) **Substitution of the Stress on the Edge of a Perforation of an Elliptically Perforated Disk by Stressing the Unperforated Disk.** G. Sonntag. *Zeitschrift für angewandte Mathematik und Mechanik,* v. 34, nos. 8-9. Aug.-Sept. 1954, p. 330-331.

Mathematical example of a relationship which may be an aid to new solutions in the plain elasticity theory. Diagrams. 2 ref. (Q21)

56-Q. (Hungarian.) **Fatigue Studies of Aluminum Alloys and of Welded Seams.** Istvan Varga. *Kohaszati Lapok,* v. 9, no. 10, Oct. 10, 1954, p. 474-480.

Tests on Al-Cu-Mg, Al-Mg-Si, Al-3% Mg and Al-5% Mg alloys in air, river water, motor oil and ethyl benzene. Diagrams, graphs, photographs. (Q7, Al, Mg, Cu, Si)

57-Q. (Italian.) **Influence of Hardening and Recrystallization on the Elastic Constants of Aluminum.** F. Gatto. *Alluminio,* v. 23, no. 5, Oct. 1954, p. 503-513.

Electro-acoustic tests permit study of structural changes for various hardening treatments. Graphs, diagrams, photograph, tables. 13 ref. (Q21, J27, Al)

58-Q. (Russian.) **Influence of Boron on the Properties of Austenitic Chromium-Nickel Steel of the Kh15N25 Type (15 Cr, 25 Ni).** N. S. Kreshchanovskii, V. I. Prosvirin and E. S. Ginzburg. *Liteinoe Proizvodstvo,* 1954, no 5, Aug., p. 16-19.

Influence of boron additions (0.02 to 1.0%) on crystalline structure, amount of carbides, rate of aging, impact strength and hardness of cast and forged Kh15N25 steel. Tables, graphs, micrographs, photographs. 7 ref.
(Q29, Q6, M26, N7, AY, SS)

59-Q. (Russian.) **Improvement of Mechanical Properties of Cast Steel When the Lost-Wax Method Is Used.** N. S. Kreshchanovskii, M. L. Khenkin, and M. N. Zimmering. *Liteinoe Proizvodstvo,* 1954, no. 7, Oct., p. 20-24.

Experimental investigation of influence of cerium addition on the mechanical properties of 35L, U10A, ShKh15, Kh15N15, EI257 and Kh12 steels. Tables, graphs, micrographs. 3 ref. (Q general, E15, CI)

60-Q. (Russian.) **Relationship Between Wear Resistance of Metals Under Friction Against an Abrasive Surface and Their Hardness.** M. M. Khruschov and M. A. Babichev. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 3-9.

Method of investigation and diagrams of hardness (Vickers or microhardness) versus wear resistance for pure metals, various carbon steels and cold hardened metals. Diagrams, table. 4 ref.
(Q29, Q9, CN)

61-Q. (Russian.) **Problem of Application of Radioactive Isotopes for Study of Wear of Machine Parts.** P. E. D'iachenko. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 9-14.

General discussion, with particular attention to machine parts that are not easily accessible to ordinary investigation, such as piston rings. Graphs, diagrams. (Q9)

62-Q. (Russian.) **Comparison of Conditions of Fatigue Strength.** I. A. Birger. *Vestnik Mashinostroeniia,* v. 34, no. 9, Sept. 1954, p. 14-20.

Treats mathematically the fatigue-strength patterns of plastic metals for the important practical case where only normal and tangential stresses are acting. Graphs. 7 ref. (Q7)

63-Q. (Russian.) **Influence of Mechanical Treatment on Wear Resistance of Steel Parts of Machinery.** A. A. Matalin. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 57-62.

Influence of residual stresses and surface finish on wear resistance. Diagrams. 5 ref. (Q25, Q9, ST)

64-Q. (Russian.) **Quality of Surface and Fatigue Strength.** D. D. Papshev. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 64-68.

Influence of surface finish on fa-

tigue strength. Relates surface characteristics to cutting cycles and geometric parameters of cutting edges. Diagrams, table. 11 ref. (Q7)

65-Q. Stresses in Short Beams. I. Experimental Analysis. J. S. Caswell. *Engineering,* v. 178, Nov. 12, 1954, p. 625-628.

Compares theoretical estimate of the maximum shear stresses with an experimental estimate obtained by photoelastic analysis. Graphs, fringe patterns, diagram. 2 ref. (Q2)

66-Q. Mechanisms of Creep in a Precipitation Hardened Alloy. G. C. E. Olds. *Physical Society, Proceedings,* v. 67, no. 419B, Nov. 1954, p. 832-842 + 1 plate.

Studies of a 97% copper, 3% silver alloy. Diagrams, graphs, tables. 16 ref. (Q3, J27, Cu, Ag)

67-Q. The Slip Modes of Titanium and the Effect of Purity on Their Occurrence During Tensile Deformation of Single Crystals. A. T. Churchman. *Royal Society, Proceedings,* v. 226, ser. A, Nov. 9, 1954, p. 216-226.

Modes of slip were identified as (1010) [1120], (1011) [1120] and (0001) [1120]. Tables, photograph, diagrams. 16 ref. (Q24, Ti)

68-Q. Tests of Extruded Magnesium Cargo Flooring for Aircraft. J. A. Liska. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1550-I, Oct. 1954, 11 p. + 38 plates.

Load tests on floor panels of various designs. Tables, diagrams, photographs, graphs. (Q28, T24, Mg)

69-Q. Shearing-Stress Measurements by Use of a Heated Element. H. W. Liepmann and G. T. Skinner. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3268, Nov. 1954, 27 p.

Use of small elements embedded in the surface of a solid to obtain local skin-friction coefficients. Graphs, diagrams. 9 ref. (Q2)

70-Q. Investigation of Static Strength and Creep Behavior of an Aluminum-Alloy Multiweb Box Beam at Elevated Temperatures. Eldon E. Mathauser. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3310, Nov. 1954, 21 p.

Tests on beams made of 24S-T3. Lifetime can be satisfactorily predicted from stress-rupture data. Tables, diagrams, photographs, graphs. 14 ref. (Q3, Q4, Al)

71-Q. Fatigue of Metals—Notched Bodies. Results of Tests Conducted at Swiss Federal Institute for Testing Materials in 1948-50. M. Ros. *Henry Brutcher, Altadena, Calif., Translation no.* 2959, 9 p. (From *Revue de Métallurgie,* v. 48, no. 10, 1951, p. 723-733.)

Previously abstracted from original. See item 69-Q, 1952. (Q7)

72-Q. Influence of Manganese Upon the Mechanical Properties of Welds and on Their Susceptibility to Hot Cracking. E. D. Lonskii. *Henry Brutcher, Altadena, Calif., Translation no.* 3007, 5 p. (From *Avtogennoe Delo,* v. 23, no. 10, 1952, p. 5-7.)

Previously abstracted from original. See item 772-Q, 1953. (Q general, K9, Mn)

73-Q. Formation and Breakdown of Welding Bridges Between Friction Surfaces. M. P. Levitskii. *Henry Brutcher, Altadena, Calif., Translation no.* 3403, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 92, no. 4, 1953, p. 797-798.)

Previously abstracted from original. See item 322-Q, 1954. (Q9, M25)

74-Q. (English.) **New Approach to the Theory of Residual Stresses in Welds.** Folke K. G. Odqvist. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning,* v. 25, no. 6, 1954, p. 259-263.

Origin and time history of residual stresses. Graphs, diagrams. 6 ref. (Q25, K general)

75-Q. (French.) **Influence of Copper in Steel.** Blanchard. *Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques,* v. 11, no. 11, 1954, p. 2135-2141.

Effects on mechanical properties, corrosion resistance and surface defects that occur during rolling and forging. 5 ref. (Q general, R general, F22, F23, Cu, AY)

76-Q. (French.) **Creep Properties of "Oneral", a Cast Refractory Alloy.** J. Poulignier and H. Bibring. *Recherche Aéronautique,* 1954, no. 41, Sept.-Oct., p. 47-51.

Characteristics of alloy which has cobalt-chromium base, containing Mo, Ni, Ti, Zr and C. Graphs, photographs. (Q3, SG-h)

77-Q. (German.) **Dispersion and Symmetry of the Texture of Sheet Metals Investigated on the Example of Aluminum Foils.** Johanna Grewen and Günter Wassermann. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 570-576.

Texture determination of aluminum foil by the counting tube process. Table, graph, pole figures. 14 ref. (Q24, Al)

78-Q. (German.) **Rolling and Recrystallization Textures of Aluminum. Texture Investigations on Hot Rolled Sheet Aluminum.** Wolfgang Bunk, Kurt Lücke and Georg Masing. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 584-593.

Effect of rolling and heat treating on the texture of thin and heavy sheet aluminum. Table, pole figures. 11 ref. (Q24, Al)

79-Q. (German.) **Creep Tests on Aluminum Monocrystals at Successively Increased Loads.** Martin Bauser and Ulrich Dehlinger. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 618-621.

Experimental equipment and procedure for measuring very small elongations. Diagram, graphs, table. 5 ref. (Q3, Al)

80-Q. (Book.) **Behavior of Metals Under Impulsive Loads.** John S. Rinehart and John Pearson. 256 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $5.50.

Concept of impulsive loading, properties of materials, methods of observation, equipment, deformation, and structural changes. (Q general)

81-Q. (Book.) **Fatigue.** Thomas J. Dolan, B. J. Lazan, and Oscar J. Horger. 121 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $3.00.

Basic concepts of fatigue damage, fatigue failure under resonant vibration conditions, and fatigue characteristics of large sections. (Q7)

82-Q. (Book.) **Fatigue Tests on Rolled Alloy Steels Made in Electric and Open-Hearth Furnaces.** P. H. Frith. Special Report No. 50, British Iron and Steel Research Association. 130 p. + 22 plates. 1954. The Iron and Steel Institute, 4 Grosvenor Gardens, London S.W.I., England £1/0/8.

Ratios of reversed bending and reversed torsional fatigue strengths for steels heat treated to various strengths. Effects of production method and inclusions. (Q7, AY)

83-Q. (Pamphlet.) **The Ductile Fracture of Metals: Mechanical Anisotropy in SAE 4340 Steel.** Office of Naval Research. Report no. PB 111423. 29 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00.

Tests on vacuum melted, aircraft quality, and commercial steels indicate that inclusions are not principal source of microcracks. (Q26, AY)

84-Q. Energy Theorems and Structural Analysis. I. General Theory. J. H. Argyris. *Aircraft Engineering,* v. 26, Nov. 1954, p. 383-387, 394.

Effects of temperature, nonlinear stress-strain relations. The principle of virtual forces. Diagrams. (To be continued.) (Q25)

85-Q. Lateral-Longitudinal Strain Ratio for Plastic Strains. T. F. W. Smith. *Engineer,* v. 198, Nov. 19, 1954, p. 692-693.

Variation of Poisson's ratio with strain and the effect of changes of volume. Graphs, table. (Q27)

86-Q. Stresses in Short Beams. II. Theoretical Analysis and Conclusions. J. S. Caswell. *Engineering,* v. 178, Nov. 19, 1954, p. 656-658.

Theory of stress distribution. Graphs, diagrams. (Q25)

87-Q. Effects of Surface Treatment on the Strength and Endurance of Steels. *Engineers' Digest,* v. 15, Nov. 1954, p. 466-468.

Methods and results of increasing strength of machine components by hardening surface layer or by introducing favorable stresses. Graphs, diagrams. 6 ref. (Q23, Q7, ST)

88-Q. The Role of Friction in Metal-Working Processes. Hugh Ford. *Institute of Petroleum, Journal,* v. 40, Oct. 1954, p. 291-294.

Examines coefficient of friction in the processes and compares typical values with those found in the usual slider tests. Possible mechanism of friction; requirements of lubricants. Diagrams, tables. 11 ref. (Q9, G general)

89-Q. How to Control Hydrogen Embrittlement in 12 Chrome Steels. A. E. Durkin. *Iron Age,* v. 174, Dec. 9, 1954, p. 154-156.

Effects of heat treatment and corrosion prevention on embrittlement. Graphs, table. 3 ref. (Q23, R general, SS)

90-Q. Materials for 1000° C. (1832° F.) (Digest of "Exploratory Creep Tests on Metals of High Melting Point", by N. P. Allen and W. E. Carrington; *Journal, Institute of Metals,* v. 82, 1953-54, p. 525-533.) *Metal Progress,* v. 66, Dec. 1954, p. 180, 182.

Creep strength of the refractory metals is so low at 1000° C. that it is doubtful if alloying will produce useful material. Some principles for the formulation of bonded carbide bodies. (Q3, EG-d, C-n)

91-Q. A Low-Alloy, Cr-Mo-Ti-B Steel for Use up to 1200° F. *Metal Progress,* v. 66, Dec. 1954, p. 84-89.

Cornell Aeronautical Laboratories, under sponsorship of the Materials Laboratory, Wright Air Develop-

ment Center, U.S.A.F., find that semicommercial heat of boron-treated 3% Cr, 0.5% Mo, 0.5% Ti low carbon steel has creep and stress-rupture properties superior to stabilized 18-8, at least at temperatures up to 1200° F. and times up to 100 hr. It should be quite useful for rockets and missiles. Micrographs, graphs. (Q3, Q4, T2, AY)

92-Q. A Correlation of Metallurgical Hardness and Buffability. Harold Faint and R. Scott Modjeska. *Plating,* v. 41, Dec. 1954, p. 1422-1425; disc., p. 1426.

Tests fail to show direct relationship of microhardness and buffing properties of copper plated on mild steel. Photographs, micrographs, table. 9 ref. (Q29, L10, Cu, CN)

93-Q. Effects of Shock Loadings. W. M. Murray. *Product Engineering,* v. 25, Dec. 1954, p. 171-175.

Analysis shows that dynamic stresses are not always twice the static stress but depend on ratio of application rate to natural period. Graphs, oscillograms, tables, diagram. (Q6)

94-Q. Stress Concentration in the History of Strength of Materials. S. Timoshenko. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 1-12.

Review of theoretical and experimental work. Diagrams, graphs, photographs. 34 ref. (Q23, Q25)

95-Q. Structural Analysis by Electrical Analogy. G. W. Riesz and B. J. Swain. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 13-22.

Use of equivalence between stored energy in a network of resistors and capacitors and strain energy in a structure to solve indeterminate problems. Circuits, photograph, graphs. 6 ref. (Q25)

96-Q. Precise Investigation of Two Model Columns—Experimental Technique. J. R. Benjamin. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 23-26.

Study of simple elastic prismatic model columns. Photographs, graph, table. (Q25)

97-Q. Ballast Circuit Design. R. C. Geldmacher. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 27-32; disc., p. 33-38.

Effects of various parameters on accuracy of a ballast circuit in strain gage bridges. Circuits, graphs, table. (Q25)

98-Q. Stresses in Oval Tubes Under Internal Pressure. J. C. Weydert. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 39-54.

Analytic and experimental study. Table, graphs, fringe patterns, photographs. 10 ref. (Q25)

99-Q. A New Cementable Material for Two- and Three-Dimensional Photoelastic Research. M. M. Frocht and Hui Pih. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 55-64.

Mechanical and optical properties of Castolite, a material suitable for stress freezing. Photographs, diagrams, fringe patterns, graphs, table. 6 ref. (Q25, P17)

100-Q. Applications of Experimental Stress Analysis to Torsion Research. C. E. Work and T. J. Dolan. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 79-90.

System of electrical, optical and mechanical equipment to determine effects of temperature and strain rate on torsion of metals. Photographs, diagrams, table, graphs. (Q25, Q1)

101-Q. A Method of Deriving Residual Stress Equations. J. W. Lambert. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 91-96.

Equations relating residual stress distribution to strains measured during removal of successive layers of material. Graphs. 5 ref. (Q25)

102-Q. Photoelastic Stress Analysis for an Edge Crack in a Tensile Field. D. Post. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 99-116.

Experimental results correlated with calculated data. Theory of advanced nucleation of fracture. Diagrams, fringe patterns, graphs, micrographs. 14 ref. (Q25, Q26)

103-Q. A Piezoelectric Strain Gage. E. A. Ripperger. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 117-124.

Thin wafers of barium titanate are 500 times as sensitive as resistance wire gages and may be reused. Individual calibration is required. Diagram, circuits, graphs. 10 ref. (Q25)

104-Q. Vehicle Vibration and Stress Testing. H. W. Larsen. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 125-134.

Techniques for experimental analysis of vibrations. Graphs, photographs. (Q25)

105-Q. An Analysis of the Phenomenon of High Temperature Creep. O. D. Sherby and J. E. Dorn. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 139-154.

Review of creep phenomena, creep rates, mathematical model. Analysis of creep in aluminum. Graphs, reflectograms, micrographs. 43 ref. (Q3, Al)

106-Q. Metallurgical Aspects of Strength at Elevated Temperatures. G. V. Smith. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 155-162.

Effects of metallurgical variables and changes during service on properties. Graphs, micrographs. 16 ref. (Q23)

107-Q. Experimental Analysis of the Buckling of Cylindrical Shells Subjected to External Hydrostatic Pressure. E. Wenk, Jr., R. C. Slankard and W. A. Nash. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 163-180.

Observed buckling configurations indicate boundary conditions differ from von Mises assumptions. More study is required for influence of imperfections. Photographs, tables, graphs, diagrams. 27 ref. (Q28)

108-Q. The Use of Photometric Devices in the Solution of the General Three-Dimensional Photoelastic Problem. M. M. Frocht, Hui Pih and D. Landsberg. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 181-190.

Equipment and techniques; possible accuracy when combined with the shear-difference method. Diagram, photographs, fringe pattern, graphs. 11 ref. (Q25)

109-Q. Residual Stresses in a Strip in Terms of Strain Changes During Electropolishing. D. O. Leeser and R. A. Daane. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 203-208.

Relatively simple accurate method of analysis. Diagrams, table. 3 ref. (Q25, L13)

110-Q. An Automatic Load Control for Fatigue Test Equipment. E. K. Benda and R. A. Gallant. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 209-214.

Equipment for use with a tuning fork type machine. Photograph, diagram, circuits, graph. 3 ref. (Q7)

111-Q. Further Notes on Automatic Control as Applied to Fatigue Test Equipment. T. A. Hewson. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 1, 1954, p. 215-226.

Load controls for resonance and hydraulic test machines. Diagrams, photographs, graph. (Q7)

112-Q. (German.) **American Brittle-Fracture Experiments and the Conclusions for Brittle-fracture Testing.** Karl Rühl. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 421-433.

Review of literature. Graphs, diagrams, tables. 44 ref. (Q26, Q23)

113-Q. (German.) **Metallurgical Considerations on the Question of Fracture.** Eduard Houdremont and Hans-Joachim Wiester. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 9-10, Sept.-Oct. 1954, p. 435-443; disc., p. 444-446.

Internal and external conditions as causes of metal fractures; methods of reducing susceptibility to fracture. Photograph, diagrams, graphs, micrographs. 37 ref. (Q26)

114-Q. (German.) **Studies on the Cubic State of Copper.** W. Gruhl and J. Gumper. *Metall,* v. 8, nos. 21-22, Nov. 1954, p. 830-834.

Effect of multidirectional rolling and heat treating on the cubic structure of copper of 97.6% purity. X-ray diagrams, micrographs, diagrams. 15 ref. (Q24, M26, Cu)

115-Q. (German.) **Modulus of Elasticity and Yield Point of Copper and Copper Alloy Spring Sheet.** P. Melchior. *Metall,* v. 8, nos. 21-22, Nov. 1954, p. 850-852.

Correlation between tensile strength, modulus of elasticity, and yield point. Graphs. (Q21, Q23, Cu)

116-Q. (German.) **Elastic Hysteresis. Elastic Hysteresis and Internal Stresses.** H. Frinken and E. Kappler. *Naturwissenschaften,* v. 41, no. 20, Oct. 1954, p. 472-473.

Correlation between elongation and stress on removing and reapplying a load on a plastically deformed bar; relationship of internal stresses to area of statically measured elastic hysteresis curve. Graphs. 4 ref. (Q21, Ni)

117-Q. (German.) **Spontaneous Hardening by the Frank-Read Source.** Franz Eder and P. Täubert. *Naturwissenschaften,* v. 41, no. 20, Oct. 1954, p. 473-475.

Explanation of theory by dislocations, foreign atoms and other irregularities in the lattice. Diagrams, graph. 4 ref. (Q29, M26)

118-Q. (German.) **Experiences With Long-Time Creep Tests on Heat Resistant Steels.** H. Holdt. *VDI Zeit-*

schrift des vereines deutscher Ingenieure, v. 96, no. 32, Nov. 11, 1954, p. 1091-1098.

Experimental study of the creep resistance of high-temperature steels after 10,000 hr. and, by extrapolation, 100,000 hr.; data on the compositions, yield points, tensile strengths, fracture elongation, reduction of area and notch-impact resistance. Graphs, tables. 8 ref. (Q3, AY)

119-Q. (German.) **The Stress Functions of the Three-Dimensional Isotropic Elasticity Theory.** Ekkehart Kröner. *Zeitschrift für Physik,* v. 139, no. 2, 1954, p. 175-188.

Treatment of the isotropic integration problem of elastostatics with the aid of the tensor of stress functions. 8 ref. (Q21)

120-Q. (Russian.) **Temperature Dependence of Internal Friction of Aluminum and Copper.** V. S. Postnikov. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 9, Sept. 1954, p. 1599-1608.

Heat of activation of viscous flow at grain boundaries is the same as for self diffusion. Mechanism of relaxation. Graphs. 22 ref. (Q22, N1, Al, Cu)

121-Q. (Russian.) **Influence of Carbon Content on the Hardness of Carbon Steels at High Temperatures.** M. G. Lozinskii and S. G. Fedotov. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 9, Sept. 1954, p. 1609-1612.

Ratio of hardness to ultimate strength at temperatures up to 860° C. and carbon contents up to 1.5%. Graphs. 19 ref. (Q29, CN)

122-Q. (Russian.) **Theory of Elastic Deformation of a Polycrystalline Alloy.** A. V. Gur'ev. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 9, Sept. 1954, p. 1644-1659.

Formulas and experimental proof for carbon steels. Mechanical hysteresis. Diagrams, table, graphs. 10 ref. (Q21, CN)

123-Q. The Distribution of Stress Round Cylindrical Openings. J. C. Jaeger. *Chemical Metallurgical & Mining Society of South Africa, Journal,* v. 55, Nov. 1954, p. 125-128.

Mathematical analyses. Graphs, table. 6 ref. (Q25)

124-Q. Stresses in Rectangular Plate Projections. I. J. C. Chapman. *Engineer,* v. 198, Dec. 3, 1954, p. 762-765.

Relaxation method used to derive displacements and stresses in plates having imposed displacements along one long edge, with respect to the structural behavior of ships' superstructures. Photograph, stress curves. (To be continued.) (Q25)

125-Q. The Torsion Centre of Girders. J. S. Terrington. *Engineering,* v. 178, Nov. 26, 1954, p. 688-691.

Application of shell analysis to structural sections and equations for determining the elastic stability of beams. Diagrams, table. 14 ref. (Q1, Q21)

126-Q. Hardness Testing With the Vickers Machine. H. G. Harper. *Sheet Metal Industries,* v. 31, no. 332, Dec. 1954, p. 1001-1007.

Advantages, precautions, interpretation of data. Graphs, diagram, photographs, tables. (Q29)

127-Q. Fatigue Failure—Why it Occurs. R. Weck. *Welding and Metal Fabrication,* v. 22, Dec. 1954, p. 455-458, 477.

Shortcomings of designing for static strength requirements; effects of stress concentrations. Photographs. (Q7, Q25)

128-Q. Root Conditions in a V-Notch Charpy Impact Specimen. H. A. Lequear and J. D. Lubahn. *Welding Journal,* v. 33, Dec. 1954, p. 585S-588S.

Tests on a geometrically similar specimen large enough to measure local strains. Photographs, diagrams, graphs. 3 ref. (Q6)

129-Q. Residual Stress and the Compressive Strength of Steel. A. W. Huber and L. S. Beedle. *Welding Journal,* v. 33, Dec. 1954, p. 589S-614S.

Stress analysis of welded steel structures. Theories explain experimental behavior. Diagrams, graphs, tables, photographs. 19 ref. (Q25, K9, CN)

130-Q. Stresses From Radial Loads in Cylindrical Pressure Vessels. P. P. Bijlaard. *Welding Journal,* v. 33, Dec. 1954, p. 615S-623S.

Design information for stresses caused by loads transmitted through attachments. Diagrams, graphs, tables. 4 ref. (Q25)

131-Q. What We Need to Know About Creep. John E. Dorn and Lawrence A. Shepard. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 3-28; disc., p. 28-30.

Methods of testing, isolation of effects of variables such as temperature, stress and structural changes, problems needing further clarification. Graphs, refractograms, micrographs, table. 20 ref. (Q3)

132-Q. The Problem of Thermal Stress Fatigue in Austenitic Steels at

Elevated Temperatures. L. F. Coffin, Jr. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 31-50; disc., p. 51-52.

Mechanisms for strain localization, relationships between strain change and cycles to failure. Diagrams, graphs, photographs, tables. 11 ref. (Q7, SS)

133-Q. Effect of Temperature Cycling on the Rupture Strength of Some High-Temperature Alloys. James Miller. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 53-65; disc., p. 65-66.

Calculated and test data correlated. Tables, graphs. 6 ref. (Q4, Co, Ni, Cr, SS)

134-Q. Experiments on the Effects of Temperature and Load Changes on Creep Rupture of Steels. G. V. Smith and E. G. Houston. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 67-76; disc., p. 77-78.

Creep rate may be changed but generalized prediction cannot be made from present data. Tables, graphs. 9 ref. (Q3, Q4, SS)

135-Q. Effects of Cyclic Overloads on the Creep Rates and Rupture Life of Inconel at 1700 and 1800° F. R. H. Caughey and W. B. Hoyt. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 79-102; disc., p. 103-104.

Tests at 1700 and 1800° F. on coarse-grained specimens showed reduced total life and elongation; creep rates were accelerated. Tables, micrographs, graphs. (Q3, Q4, Ni, Cr)

136-Q. The Creep-Rupture Properties of Aircraft Sheet Alloys Subjected to Intermittent Load and Temperature. G. J. Guarnieri. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 105-146; disc., p. 147-148.

Test data for stainless steel, Inconel "X", N-155 alloy, and titanium, aluminum and magnesium alloys. Tables, diagram, graphs, micrographs, refractograms. 6 ref. (Q3, Q4, Cr, Ni, Co, SS, Ti, Al, Mg)

137-Q. Constant and Cyclic-Load Creep Tests of Several Materials. Ward F. Simmons and Howard C. Cross. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 149-161.

Data for 24S-T3 and 24S-T81 aluminum alloys and SAE 4130 and AISI 310 steels. Creep rates did not increase. Tables, graphs. (Q3, Al, AY, SS)

138-Q. (Czech.) **Cause of Embrittlement of Pt/Pt-Rh Thermocouples.** Frantisek Kralik. *Hutnické Listy,* v. 9, no. 8, Aug. 1954, p. 478-481.

Formation of platinum silicide is principal cause. Refractograms, table. 10 ref. (Q23, Pt, Rh, Si)

139-Q. (Czech.) **Examples of Intergranular Fracture of Steel.** Zdenek Kaderavek. *Hutnické Listy,* v. 9, no. 10, Oct. 1954, p. 578-593.

Theory of grain boundry conditions and fracture of carbon and alloy steels. Tables, graphs, micrographs. 25 ref. (Q26, ST)

140-Q. (Dutch.) **Copper and Copper Alloys. XIV. Special Brass.** W. G. R. de Jager. *Metalen,* v. 9, no. 21, Nov. 15, 1954, p. 342-343.

Mechanical properties as a function of thickness. Diagram, graphs, table. 15 ref. (Q general, Cu)

141-Q. (French.) **Introduction to the Study of the Stamping Ability of Sheets. Internal Mechanics and Plasticity of Solids.** Pierre Vauthier. *Métaux, Corrosion-Industries,* v. 29, no. 350, Oct. 1954, p. 361-371.

Plasticity of single crystals and polycrystalline materials, microcracks, criteria for various sheet metals. Diagrams. (Q23, G1)

142-Q. (Hungarian.) **Fatigue Limit of Aluminum Castings and of Their Welded Bonds Exposed to Alternating Stress. II.** Istvan Varga. *Kohaszati Lapok,* v. 9, no. 11, Nov. 1954, p. 509-512.

Rotating bend tests on high-strength alloys in various media. The welds investigated were made by argon-arc welding. Graphs, tables, photographs. 3 ref. (Q7, K1, Al)

143-Q. (Russian.) **Methods and Results of the Investigation of the Bulk Elasticity of a Substance.** M. Kornfel'd. *Uspekhi Fizicheskikh Nauk,* v. 54, no. 2, Oct. 1954, p. 315-342.

Equipment, techniques, theories. Diagrams, tables, graphs. 24 ref. (Q21)

144-Q. (Russian.) **Residual Stresses in Piston Pins Made of Steel 45 by**

Induction Surface Hardening. S. E. Garf and V. A. Kukuevitskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 10, Oct. 1954, p. 1830-1833.

Microhardness, depth of tempered layer. Graphs. 5 ref. (Q25, Q29, J29, ST)

145-Q. (Swedish.) **Physical Properties of Forged Steel as Affected by Dendritic or Globular Ingot Structure.** A. Hultgren, K. O. Nordin, and B. Rinman. *Jernkontorets Annaler,* v. 138, no. 11, 1954, p. 702-730.

Influence of disturbed ingot solidification on mechanical properties of three steels in forged and heat treated condition. Diagrams, tables, micrograph, graphs. (Q general, N12, AY)

146-Q. Wings Under Repeated Thermal Stress. E. W. Parkes. *Aircraft Engineering,* v. 26, Dec. 1954, p. 402-406.

Permanent elasticity, shakedown, alternate plasticity and incremental collapse in wings subjected to a number of thermal cycles. Diagrams, tables, graph. 4 ref. (Q21, Q23)

147-Q. Energy Theorems and Structural Analysis. II. Applications to Thermal Stress Problems and St. Venant Torsion. J. H. Argyris and S. Kelsey. *Aircraft Engineering,* v. 26, Dec. 1954, p. 410-422.

Generalized discourse with applications on energy principles, temperature effects, and nonlinear stress-strain relations. Graphs, tables, diagrams. 7 ref. (To be continued.) (Q25)

148-Q. Magnetic Hardness-Testing. *Aircraft Production,* v. 16, Dec. 1954, p. 491-493.

Rapid method of inspecting ferrous parts based on magnetic remanence. Photographs, diagrams, circuit diagram, graph. (Q29, Fe)

149-Q. Strain-Ageing and the Yield-Point Elongation of Low-Carbon Steels. H. P. Tardif. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 512, Dec. 1954, p. 797-803; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 499-505.

Activation energy of strain aging; effects of microstresses on yield-point elongation; directional effects. Graphs. 10 ref. (Q27, CN)

150-Q. Carbon-Molybdenum Steel Steam Pipe After 100,000 Hours of Service. R. J. Sinnott, I. A. Rohrig, J. W. Freeman and A. I. Rush. *Combustion,* v. 26, Dec. 1954, p. 45-51.

Evaluates design considerations and laboratory data in terms of creep in service. Tables, graphs, diagram. 5 ref. (Q3, AY)

151-Q. The Prevention of Cracking in Nickel Electrodeposits. T. E. Such. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 13, v. 31, 1954, 17 p. + 2 plates.

Determination of internal stresses and ductility for production control. Procedures for improving mechanical properties. Diagrams, graphs, photographs, tables. 17 ref. (Q25, Q23, L17, Ni)

152-Q. How Notch Sensitive Are Titanium Alloys? F. R. Brotzen, E. L. Harmon, Jr., and A. R. Troiano. *Iron Age,* v. 174, Dec. 30, 1954, p. 52-55.

Effects of composition and heat treatment on properties of titanium-vanadium alloys. Micrographs, diagram, graphs, tables. (Q general, Ti, V)

153-Q. Grain-Boundary Properties Effecting Cleavage Fracture. J. Short and A. Muscott. *Iron and Steel Institute, Journal,* v. 178, Dec. 1954, p. 368.

Mechanical analogy helps explain behavior of dislocations at grain boundaries. Diagram. 7 ref. (Q26)

154-Q. Designing With Aluminum. IX. Choosing an Aluminum Casting Alloy & Heat Treatment. *Materials & Methods,* v. 40, Dec. 1954, p. 15-18.

Data sheets listing mechanical properties and casting characteristics. (Q general, E general, Al)

155-Q. Mechanical Properties at Room Temperature of Four Cermets of Tungsten Carbide With Cobalt Binder. Aldie E. Johnson, Jr. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3309, Dec. 1954, 16 p.

Stress-strain data for compression, tension and shear loadings; density and hardness values. Graphs, table, photograph. 4 ref. (Q general, Co, WC)

156-Q. Prestressing Wires—Stress-Relaxation and Stress-Corrosion up to Date. Gordon T. Spare. *Wire and Wire Products,* v. 29, Dec. 1954, p. 1421-1424, 1492-1493.

Properties of wire for use in prestressed concrete. Corrosion protection, embrittlement hazards. Diagram, micrographs, graphs. (Q25, R1, ST)

157-Q. Creep and Fracture at Elevated Temperatures. Nicholas J. Grant. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 1-28.

Nature of creep in pure and commercial metals and alloys; utilization of creep and creep-rupture data. Micrographs, graphs, refractograms. 48 ref. (Q3, Q4, SG-h)

158-Q. Factors Involved in Using High Temperature Test Data for Selecting Materials and Proportioning Parts. Claude L. Clark. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 29-54.

Importance of factors other than stress and temperature; interrelationship of various criteria. Tables, graphs, photographs, micrographs. (Q general, SG-h)

159-Q. Alloys and Their Properties for Elevated Temperature Service. Howard C. Cross and Ward F. Simmons. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 55-96.

Significant developments since 1922; areas which need further attention. Tables, graphs. 29 ref. (Q general, SG-h)

160-Q. Stress Calculations for Design for Creep Conditions. Paul F. Chenea. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 97-105.

Factors affecting a workable theory include equations of motion or equilibrium, kinematics of the deformation and equations of state and dissipation relations. Diagram, graph. 15 ref. (Q3)

161-Q. Metallurgical Variables Influencing Properties of Heat Resistant Alloys. J. W. Freeman, C. L. Corey and A. I. Rush. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 244-265.

Influence of melting practice, composition, forming procedures and heat treatment on creep, rupture, fatigue, stress concentrations, mechanical and thermal shock, thermal gradients and corrosion. Graphs, tables, micrographs. 23 ref. (Q general, SG-h)

162-Q. (English.) **The Crystallographic Aspect of the Mechanical Twinning in Metals.** Hiroshi Kiho. *Physical Society of Japan, Journal*, v. 9, no. 5, Sept.-Oct. 1954, p. 739-747.

Crystallographic calculations show possible twinning planes in various metals. Tables, graphs. 15 ref. (Q24)

163-Q. (French.) **Approximate General Solution of Equations of Plasticity for the Two-Dimensional Case.** Matthias Matschinski. *Comptes rendus,* v. 239, no. 21, Nov. 22, 1954, p. 1348-1350.

Solutions obtained by linearizing the Treska buckling condition. An example of corrugation under compression is considered. (Q23)

164-Q. (French.) **Optical Method of Measuring and Separation of Stresses in Plane Elasticity.** Paul Acloque. *Comptes rendus,* v. 239, no. 21, Nov. 22, 1954, p. 1350-1352.

By using an oblique beam polarized at 45° from the plane of incidence, it is possible to obtain the separate values of stresses. Diagram. (Q25)

165-Q. (German.) **Rheological Problems of Photoelasticity.** W. Feucht. *Kolloid-Zeitschrift,* v. 139, nos. 1-2, Nov. 1954, p. 17-37; disc., p. 37-38.

Importance of photo-elastic testing to practical and theoretical research of strength problems, and its principles demonstrated on different types of material. Diagrams, photographs, graphs, table. 2 ref. (Q25)

166-Q. (German.) **Mechanism of Plastic Flow.** J. Kubat. *Kolloid-Zeitschrift,* v. 139, nos. 1-2, Nov. 1954, p. 60-65; disc., p. 65-66.

Shows the independence of the time lapse of relaxations and recoveries at constant elongation from the momentary external stress. A possible explanation. Graphs, diagram. 5 ref. (Q24)

167-Q. (German.) **Investigations of the Dependence of Vickers Microhardness Upon the Load. I.** Helmut Bückle. *Zeitschrift für Metallkunde,* v. 45, no. 11, Nov. 1954, p. 623-632.

Experimental basis, existing hypotheses, sources of errors, the problem of the elastic spring effect. Table, graphs, micrographs. 36 ref. (Q29)

168-Q. (Russian.) **Internal Stresses of Electrolytic Deposits of Nickel and Their Porosity.** A. T. Vagramian and Iu. S. Tsareva. *Doklady Akademii Nauk SSSR,* v. 98, no. 5, Oct. 11, 1954, p. 807-809.

Influence of surface-active substances (naphthalene disulfonate and paracresol) and alternating current. Graphs. 2 ref. (Q25, L17, Ni)

169-Q. (Book.) **Handbook of Aeronautics, No. 1. Structural Principles and Data.** 4th Ed. 322 p. 1952. Sir Isaac Pitman & Sons, Ltd., Pitman House, Parker St., Kingsway, London, W.C.2, England; Pitman Publishing Corp., New York, N. Y., $8.50.

Loading systems and stresses and their relation to structural airworthiness; theory of structures in the

design and analysis of stressed skin structures. (Q general, T24, Al)

170-Q. (Book.) **Research and Development of Metals and Alloys for Low Temperature Applications.** Report PB 111453. 77 p. 1954. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $2.00.

Recommendations for improving efficiency of military equipment operating at low temperatures. Mechanisms of fracture and deformation; welding techniques; nondestructive testing. (Q23, Q26, K general, S general)

171-Q. (Book.) **Smithsonian Physical Tables.** William Elmer Forsythe. 9th Rev. Ed. 827 p. 1954. The Smithsonian Institution, Washington, D. C. $10.00.

Presents 901 tables covering mechanical and physical properties of materials including metals, alloys, and minerals of metallurgical interest. (Q general, P general)

172-Q. (Book.) **Society for Experimental Stress Analysis, Proceedings.** v. XII, no. 1. 226 p. 1954. Society for Experimental Stress Analysis, Central Square Station, P.O. Box 168, Cambridge 39, Mass.

Contains 23 papers which are abstracted separately. (Q25)

173-Q. (Book.) **Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures. ASTM Special Technical Publication No. 165.** 175 p. 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. $2.25.

Eight papers on creep, rupture, and oxidation, which are abstracted individually. (Q3, Q4, R2, SG-h)

174-Q. **Protection of Titanium Metal Against Embrittlement.** Herbert R. Toler, Jr. *American Ceramic Society Bulletin,* v. 34, Jan. 1955, p. 4-8.

Rate at 1500° F. is retarded by a vacuum processed ceramic coating. Tables, diagram, photograph, graph. 16 ref. (Q23, Ti)

175-Q. **Theory of Thermal Shock Resistance of Brittle Materials Based on Weibull's Statistical Theory of Strength.** S. S. Manson and R. W. Smith. *American Ceramic Society, Journal,* v. 38, Jan. 1955, p. 18-27.

Accounts for failure of brittle materials by stress distribution and shows how error can be introduced by use of conventional maximum stress theory. Graphs, table. 6 ref. (Q23)

176-Q. **Factors Influencing the Notch Fatigue Strength of N-155 Alloy at Elevated Temperatures.** Walter S. Hyler and Ward F. Simmons. *American Society of Mechanical Engineers, Paper no.* 54-A-239, 1954, 29 p.

Effects of stress raisers of various intensities; explanation of notch-bar strengthening. (Q7, Fe, Cr, Ni, Co)

177-Q. **Factors Influencing the Notch-Rupture Strength of Heat-Resistant Alloys at Elevated Temperatures.** R. L. Carlson, R. J. MacDonald and Ward F. Simmons. *American Society of Mechanical Engineers, Paper no.* 54-A-240, 1954, 29 p.

Stress-rupture data for notched and unnotched bars of S-816, Inconel "X" and Waspaloy from 1200 to 1600° F. Evaluation of individual cases. Graphs, tables, diagrams, micrographs. 5 ref. (Q4, Q7, SG-h)

178-Q. **Some Observations on the Ductility of Ferritic Nodular Iron.** G. N. J. Gilbert. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Dec. 1954, p. 470-472 + 2 plates.

Suggests that proof stress and elongation at maximum load be used as criteria for evaluation instead of yield stress and total elongation. Table, photograph, graph. (Q23, CI)

179-Q. **Effects of Residual Stresses in Welded Structures.** G. M. Boyd. *British Welding Journal,* v. 1, Dec. 1954, p. 560-566.

Stress behavior analyzed from tensile strength, fatigue, stress corrosion, brittle fracture, elastic stability, reaction stresses and weld cracking. Diagrams, graphs, photograph. 21 ref. (Q25, CN)

180-Q. **An Evaluation of the Recovery Theory of Creep.** H. H. Bleakney. *Canadian Journal of Technology,* v. 33, Jan. 1955, p. 56-66.

Phenomenon of creep-rupture embrittlement may not be inconsistent with the recovery theory. Suggests the opposing influences of strain-hardening and thermal softening are fundamental forces in creep. Graphs, tables. 20 ref. (Q3, Al)

181-Q. **The Effect of High Loading on the Kinetic Friction of Ice.** C. D. Niven. *Canadian Journal of Physics,* v. 32, Dec. 1954, p. 782-789.

Results of tests with stainless steel, bakelite and Teflon reveal that Amontons' law does not hold true at high loadings and that the friction of ice is related to pressure and adhesion. Graphs, diagram, photograph. 9 ref. (Q9, SS)

182-Q. **Room-Temperature Ductile Chromium.** H. Johansen and G. Asai.

Electrochemical Society, Journal, v. 101, Dec. 1954, p. 604-612.

Preparation and some mechanical properties. Techniques of making brittle chromium ductile by removal of surface layers. Photographs, micrographs, tables, graph. 17 ref. (Q23, Cr)

183-Q. Combined Tension and Torsion Machine for Relaxation Tests. A. E. Johnson and N. E. Frost. *Engineer,* v. 198, Dec. 17, 1954, p. 834-835.

Creep testing under combinations of tension loads up to 600 lb. and torques up to 1000 in.-lb. over a temperature range of 20 to 800° C. Diagrams. (Q3)

184-Q. Diamond Indentors for Rockwell Hardness Testing. F. R. Tolmon and Joyce F. Hall. *Engineering,* v. 178, Dec. 10, 1954, p. 760-762.

Further developments in precision measurement and an evaluation of prescribed form. Micrographs, interferograms, diagrams. 1 ref. (Q29)

185-Q. Creep of High-Purity Nickel. William D. Jenkins, Thomas G. Digges and Carl R. Johnson. *Journal of Research, National Bureau of Standards,* v. 58, Dec. 1954, p. 329-352.

Influence of stress, temperature and prior-strain history on creep behavior of the initially annealed metal; evaluation of prestraining effect in creep on hardness and tensile properties at room temperature. Tables, graphs, photographs, micrographs. 13 ref. (Q3, Ni)

186-Q. Residual Stresses—How Dangerous Are They? Walter Soete. *Metal Progress,* v. 67, Jan. 1955, p. 108-113.

In sound structures residual stresses help propagate brittle fracture at low temperature, affect the yield point and increase corrosion rates. In structures or machine parts containing minor physical discontinuities, residual stresses may induce brittle fracture at low temperature. Diagrams. (Q25)

187-Q. A German View of Brittle Welded Structures. Edouard Houdremont. *Metal Progress,* v. 67, Jan. 1955, p. 114-120, 200, 202.

Tentative German standards specify steels for welded structures by impact strength at definite temperature. Causes of brittleness in steels, commercial means of manufacturing tough metal. Author believes annealing of weldments—even local annealing of joints—will insure safe performance of a well-designed and honestly fabricated structure. Graphs, micrographs, tables. (Q23, Q6, K general, ST)

188-Q. Criteria for Selecting Experimental Stress Analysis Methods. A. J. Durelli and E. A. Phillips. *Product Engineering,* v. 26, Jan. 1955, p. 182-191.

Nine concepts basic to selection of experimental methods; most important methods evaluated. Diagrams, stress patterns, table. 5 ref. (Q25)

189-Q. Titanium: No Time Limit on Toughness. W. L. Finlay, J. P. Catlin and D. W. Kaufmann. *Steel,* v. 136, Jan. 17, 1955, p. 92-93.

Room-temperature ductility of alpha titanium is not appreciably affected by combinations of time up to 1600 hr., temperatures up to 1000° F., and stresses to cause up to 10% elongation. Tables. (Q23, Ti)

190-Q. Brittle Failures in Ships and Other Steel Structures. K. K. Cowart. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 3-10.

Examples of failures and conditions of their occurrence. Photographs. 5 ref. (Q26, Q23, ST)

191-Q. Analysis of Brittle Behavior in Ship Plates. Morgan L. Williams. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 11-41; disc., p. 42-44.

Factors contributing to fracture on more than 130 plates. Relations between service experience, notch sensitivity and chemical composition. Photographs, graphs, diagrams. 20 ref. (Q26, Q23)

192-Q. A Critical Survey of Brittle Failure in Carbon Plate Steel Structures Other Than Ships. M. E. Shank. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 45-108; disc., p. 108-110.

Histories of various failures in industrial installations. Important factors in causes of brittle fracture. Photographs, diagrams, tables. 134 ref. (Q26, Q23, CN)

193-Q. Interest of the Army in Brittle Failures. Thurston T. Paul. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 111-114; disc., p. 115.

Significance of brittleness in steels for use in heavy guns and armor. (Q26, Q23, ST)

194-Q. Theory of Brittle Fracture and Criteria for Behavior at Low Temperatures. Earl R. Parker. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 116-130; disc., p. 131-132.

Treatment of factors leading to either cleavage or shear fractures. Tests for determining relative brittleness. Photographs, graphs, micrographs, diagrams. 21 ref. (Q26, Q23, CN)

195-Q. Brittle Fracture. S. L. Hoyt. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 133-143; disc., p. 144-146.

Notch-bar testing and its use in appraising steels for critical service conditions. Graphs, tables. 11 ref. (Q26, CN)

196-Q. Metallurgical Aspects of Low-Temperature Behavior in Ferrous Materials. C. H. Lorig. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 147-162; disc., p. 163.

Effects of composition and manufacturing variables on sensitivity to embrittlement. Graphs. 40 ref. (Q23, ST)

197-Q. Fundamentals of Fractures in Metals. M. Gensamer. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 164-173; disc., p. 174-175.

Evaluation of effects of stress states on fracture behavior. Graphs, diagram. 4 ref. (Q26)

198-Q. The Effect of Size Upon Fracturing. G. R. Irwin. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 176-188; disc., p. 188-194.

Statistical relationships on effects of specimen size and fracture behavior. Graphs, diagrams. 13 ref. (Q26, ST, Al)

199-Q. Brittleness, Triaxiality, and Localization. Wendell P. Roop. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 195-202.

Effects of stress states on mode of fracture. Diagram, graph. 13 ref. (Q26)

200-Q. Effect of Metallurgical Structures on the Impact Properties of Steels. John A. Rinebolt. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 203-214; disc., p. 215.

Effects of microstructures and composition on impact properties of five series of steels. Tables, micrographs, graphs. 6 ref. (Q6)

201-Q. Evaluation of the Significance of Charpy Tests. William S. Pellini. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 216-258; disc., p. 259-261.

Fracture and ductility transition concepts. Application of Charpy V-notch data to engineering design. Diagrams, graphs, photographs. 9 ref. (Q6, Q23, ST, CI)

202-Q. Significance of V-Notch Impact Test in Evaluation of Armor Plate. Abraham Hurlich. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 262-274.

Correlation of Charpy V-notch properties with metallurgical characteristics and ballistic performance of armor steels. Graphs, photographs, tables. (Q6, AY)

203-Q. Notch-Bend Tests for Evaluating the Properties of Weldments. Robert D. Stout. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 275-283; disc., p. 284-285.

Effects of geometrical and metallurgical changes introduced by welding. Tests for evaluation of variables. Diagrams, graphs, micrographs. 9 ref. (Q5, K general, ST)

204-Q. Reproducibility of Keyhole Charpy and Tear-Test Data on Laboratory Heats of Semikilled Steel. R.

H. Frazier, J. W. Spretnak and F. W. Boulger. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 286-303; disc., p. 304-307.

Analytical and mechanical tests on 18 heats showed good reproducibility on replicate heats. Keyhole Charpy and Navy tear-test specimens determined transition temperatures. Tables, diagram, graphs. 13 ref. (Q6, CN)

205-Q. Effect of Specimen Preparation on Notch-Toughness Behavior of Keyhole Charpy Specimens in the Transition Temperature Zone. R. W. Vanderbeck, R. W. Lindsay, H. D. Wilde, W. T. Lankford and S. C. Snyder. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 308-320; disc., p. 320-325.

Statistical analysis shows little effect of specimen preparation method on transition range for four carbon and one alloy steels. Graphs, tables, diagram, micrographs. 3 ref. (Q6, CN, AY)

206-Q. Low-Temperature Impact Properties of Titanium. David E. Driscoll. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 326-330; disc., p. 331.

Test data for various alloys. Graphs. (Q6, Ti)

207-Q. Effect of Boron on the Impact Properties of Quenched and Tempered Steels. Harry Schwartzbart and J. P. Sheehan. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 332-343; disc., p. 343-344.

Tests on quenched and tempered 2345 and 8120 steels with various amounts of boron. Boron had marked effect on variation of transition temperature with tempering temperature. Tables, graphs, micrographs. 14 ref. (Q6, Q23, AY)

208-Q. The Notched-Bar Impact Properties of Tempered Martensite in Medium-Carbon, Medium-Alloy Grades of Steel. M. Baeyertz, W. F. Craig, Jr., and J. P. Sheehan. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 345-363; disc., p. 364.

Review and analysis of published and unpublished data. Graphs, photograph, table. 12 ref. (Q6, AY)

209-Q. Notch Sensitivity of Steels. E. J. Ripling. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 365-372; disc., p. 373.

Portion of room-temperature notch brittleness due to transition behavior. Graphs, diagrams. 10 ref. (Q23, AY)

210-Q. Effect of Carbon and Nitrogen on the Tensile Deformation of High-Purity Iron at 81 F (27 C) and at −321 F (−196 C). Lewis D. Hall. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 374-381.

Tests show that carbon adds to ductility at −321° F. but nitrogen has an embrittling effect at both temperatures. Tables, graph, micrographs. 13 ref. (Q23, Fe)

211-Q. Tension Impact Strength and Strain Distribution at Room and Sub-Zero Temperatures of Stainless and Other Steels. C. R. Mayne, V. N. Krivobok and C. W. Muhlenbruch. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 382-400; disc., p. 401-404.

Effects of composition, tensile properties, temperature, gage length and notches on stainless steel sheet samples. Tables, diagrams, photographs, graphs. 9 ref. (Q6, SS)

212-Q. Ductile and Brittle Failure in Ferritic Nodular Irons (Nickel-Magnesium Type). G. N. J. Gilbert. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 415-431.

Effects of composition and heat treatment. Tables, micrograph, diagrams, graphs, photographs. 6 ref. (Q23, Q26, J general, CI)

213-Q. Low-Temperature Toughness of Flake and Spheroidal Graphite Cast Iron. J. S. Vanick. Paper from "Sym-

posium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 405-412; disc., p. 413-414.

Effects of microstructure and composition on properties down to −300° F. Tables, graphs, photograph. 2 ref. (Q23, M27, CI)

214-Q. The Low-Temperature Properties of Cast Irons. G. N. J. Gilbert. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 432-455.

Effects of composition and microstructure on impact and tensile properties down to −180 F. Tables, graphs. 4 ref. (Q6, Q23, M27, CI)

215-Q. The Impact Properties of Ferritic Ductile Iron. R. W. Kraft. Paper from "Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures". ASTM Special Technical Publication No. 158, p. 456-472; disc., p. 472-474.

No sharp transition temperature detected. Effects of silicon content. Diagram, tables, graphs, photograph. 8 ref. (Q6, Q23, CI)

216-Q. (English.) **A Study of the Plastic Deformation of Copper Single Crystals.** C. R. Cupp and B. Chalmers. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 803-809.

Stepwise tensile loading showed a delay between load application and plastic strain. Effects of dissolved hydrogen on mechanical properties. Diagrams, table, graphs. 19 ref. (Q27, Cu)

217-Q. (English.) **The Effect of Short-Time Moderate Flux Neutron Irradiations on the Mechanical Properties of Some Metals.** F. W. Kunz and A. N. Holden. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 816-822.

Tests on single crystals showed flow stress of iron and zinc was increased by radiation but lead was unchanged. Review of radiation hardening mechanisms. Graphs, table. 13 ref.
(Q general, Fe, Pb, Zn)

218-Q. (English.) **X-Ray Line Broadening From Metals Deformed at Low Temperatures.** M. S. Paterson. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 823-830.

Tests on copper, aluminum and nickel support hypothesis that broadening is due to internal stresses arising from elastic distortion of glide lamellae. Tables, graphs, diagram. 19 ref.
(Q25, M22, Cu, Al, Ni)

219-Q. (English.) **Etchpits and Dislocations Along Grain Boundaries, Sliplines and Polygonization Walls.** S. Amelinckx. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 848-853.

A one to one relation was established for etchpits and dislocations in crystals of rock salt. Micrographs. 13 ref. (Q24)

220-Q. (English.) **Strain Hardening in Face-Centered Cubic Metal Crystals.** J. Sawkill and R. W. K. Honeycombe. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 854-864.

Shear and tensile tests on gold and tensile tests on aluminum crystals showed two types of deformation bands. Diagrams, photograph, micrographs, graphs. 22 ref.
(Q24, Au, Al)

221-Q. (English.) **Deformation Textures of Face-Centered Cubic Metals.** E. A. Calnan. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 865-874.

Differences in deformation textures of aluminum, copper, alpha brass and other copper alloys explained by rotation of crystals. Tables, diagrams. 19 ref. (Q24, Al, Cu)

222-Q. (English.) **Grain Boundary Shear in Aluminum.** F. Weinberg. *Acta Metallurgica,* v. 2, no. 6, Nov. 1954, p. 889-891.

Creep tests on tricrystal test pieces show alternate shear and grain boundary migration. Diagram, photographs, micrograph. 1 ref.
(Q2, Q3, Al)

223-Q. (Czech.) **Examination of Mechanical Properties of Wrought Al-Zn6-Mg-Cu Alloy.** Petr Skulari and Vladivoj Ocenasek. *Hutnické Listy,* v. 9, no. 11, Nov. 1954, p. 655-666.

Test data for high and low temperatures. Structural changes during heat treatment. Tables, graphs, refractograms, diagram. 10 ref.
(Q general, N general, J general, Al, Zn, Mg, Cu)

224-Q. (Dutch.) **Hardness and Plasticity of Metals.** J. H. Zaat. *Metalen,* v. 9, no. 22, Nov. 30, 1954, p. 353-358; no. 23, Dec. 15, 1954, p. 373-380.

Relationship between hardness and the general stress-deformation curve. Practical applications. Graphs, table. 11 ref. (Q29, Q23)

225-Q. (French.) **Mechanical Properties of Bronze U-E12 P.** Marcel Cirou and Pierre-Julien le Thomas. *Fonderie,* 1954, no. 106, Nov., p. 4235-4240.

Effects of composition and casting variables. Diagrams, graphs. (Q general, Cu, Sn)

226-Q. (French.) **Behavior of Metallic Cables Subjected to Tension.** R. Goldschmidt. *Helvetica Physica Acta,* v. 27, no. 6, 1954, p. 508-512.

Describes apparatus which measures tension, elongation, moment of torsion and angle of torsion simultaneously. Diagram, photograph. (Q27, Q1)

227-Q. (French.) **Temper Brittleness of Extra-Soft Iron-Chromium Ferritic Steels.** H. Laplanche. *Métallurgie et la construction mécanique,* v. 86, no. 11, Nov. 1954, p. 837 + 8 pages.

Effects of embrittlement on mechanical, physical and corrosion properties. Causes of embrittlment. Graphs, tables. 28 ref. (Q23, SS)

228-Q. (Polish.) **Analysis of Tensile Test Diagram of Ductile Metals.** Zygmunt Polek. *Wiadomosci Hutnicze,* v. 10, no. 11, Nov. 1954, p. 310-314.

Types of mechanical tests and deformation; formulas. Graphs, diagram. 4 ref. (Q23, Q27, ST, Cu, Al, Mg)

229-Q. (Russian.) **Wear Resistance of Tractor and Internal Combustion Engine Parts Made of High-Quality Cast Iron.** B. N. Seredenko. *Liteinoe Proizvodstvo,* 1954, no. 8, Nov., p. 3-6.

Mechanical properties and compositions of cast irons and cast steels for various applications. Tables, graphs. (Q9, CI, AY)

230-Q. (Russian.) **Phenomenon of Brittleness in High-Strength Cast Iron.** N. G. Girshovich and M. P. Simanovskii. *Liteinoe Proizvodstvo,* 1954, no. 8, Nov., p. 12-14.

Effects of heat treatment and composition. Exact case has not been determined. Table, graphs. 3 ref. (Q23, CI)

231-Q. (Russian.) **Ultimate Symmetry of Deformation Bands.** L. A. Tolokonnikov. *Prikladnaia Matematika i Mekhanika,* v. 18, no. 5, Sept.-Oct. 1954, p. 619-626.

Mathematical analysis. Diagrams, graph. 1 ref. (Q24)

232-Q. **Arctic Regions Pose Tough Metallurgical Problems.** F. W. Myers, Jr. *Iron Age,* v. 175, Jan. 20, 1955, p. 79-82.

Typical failures experienced in military equipment. Description of "windchill" effects. Photographs, graph. 6 ref. (Q general, ST, Al, Mg)

233-Q. **Measurement of Internal Stress of Cobalt Deposited Electrolytically From Cobalt Fluoborate Baths.** D. M. Fegredo and J. Balachandra. *Journal of Scientific & Industrial Research,* v. 13, sec. B, Nov. 1954, p. 753-755.

Stress is lowered by increasing thickness of deposit and by raising current density and temperature. Table, graphs. 8 ref. (Q25, L17, Co)

234-Q. **Production of Specimens for Static and Fatigue Testing.** T. S. Braithwaite. *Machinery (London),* v. 86, Jan. 7, 1955, p. 34-36.

Special machining and polishing methods. Diagrams, photographs. (Q7, G17, L10, L11)

235-Q. **Fatigue of Metals—Our Knowledge and the Deficiencies in Our Knowledge.** P. L. Teed. *Shell Aviation News,* 1954, no. 197, Nov., p. 14-21.

Stresses, structure of metals and structural changes as factors in the mechanism of fatigue. Photographs, micrographs, graphs, table. 43 ref. (To be continued.) (Q7, Al, Cu, Fe, Au)

236-Q. **Behavior of Materials Under Conditions of Thermal Stress.** S. S. Manson. *U. S. National Advisory Committee for Aeronautics, Report* 1170, 1954, 34 p.

Reviews mathematics of thermal shock, with derivation of formula for correlating shock behavior with material properties; methods for minimizing thermal stress. Graphs, diagrams, photographs, tables. 20 ref. (Q25, Al, Be, Ti, SS, AY, Cu, Ni)

237-Q. (German.) **Fatigue and Tensile-Impact Tests on Round-Link Chains.** Karl Wellinger and Adolf Stanger. *Glückauf,* v. 90, nos. 51-52, Dec. 18, 1954, p. 1670-1673.

Effect of heat treatment on strength properties of chain links. Tables, photographs, diagrams, graphs. 2 ref. (Q7, Q6, J general)

238-Q. (German.) **A Contribution to the Technology of the Relationship Between the Carbon, Ferrite, and Titanium Contents of Austenitic Chrome-Nickel Steels and the Embrittlement in a Brittle Phase at Higher Titanium Contents.** W. Goedecke. *Werkstoffe und Korrosion,* v. 5, no. 12, Dec. 1954, p. 488-496.

Influence of carbon and carbon bonding with titanium on ferrite content. Micrographs, graphs, tables, photograph, diagram. (Q23, Ti, AY)

239-Q. (Hungarian.) **Heat Treatable Silver-Copper Alloys.** Fülöp Balazs and Gyözo Kilar. *Kohaszati Lapok,* v. 9, no. 8, Aug. 1954, p. 374-384.

Changes in mechanical properties resulting from heat treating. Graphs, micrographs, table. (To be continued.)
(Q general, J general, Ag, Cu)

240-Q. (Polish.) **Plastic Properties of Cast Metals by Hardness and Tensile Testing.** Aleksander Krupkowski. *Archiwum Gornictwa i Hutnictwa,* v. 2, no. 1, 1954, p. 27-55.

Combination of hardness and tensile data provides good criterion of plasticity. Tables, graphs, diagram. 4 ref. (Q23)

241-Q. (Polish.) **Influence of Iron and Zinc on the Technological Properties of Aluminum Alloy Pressure Die Castings.** Kazimierz Korecki and Tadeusz Welkens. *Przeglad Odlewnictwa,* v. 4, no. 9, Sept. 1954, p. 251-255.

Tests to determine best ratios. Chemical compositions in domestic and foreign alloys. Microstructures. Tables, micrographs. 5 ref.
(Q general, E13, Al)

242-Q. (Russian.) **Diagrams of Strength Properties of Metals.** M. M. Khrushchov and M. A. Babichev. *Doklady Akademii Nauk SSSR,* v. 99, no. 3, Nov. 21, 1954, p. 395-398.

Wear resistance characteristics of steels, copper, zinc and aluminum. Graphs. 3 ref.
(Q23, AY, ST, Cu, Zn, Al)

243-Q. (Russian.) **Influence of Hydrogen on the Properties of Alloys.** N. A. Galaktionova. *Doklady Akademii Nauk SSSR,* v. 99, no. 3, Nov. 21, 1954, p. 411-414.

Effect on cast iron-nickel-aluminum alloys with variations in hydrogen content, by electrolytic impregnation, in 0.1 normal sulfuric acid solution at various temperatures and pressures. Micrographs, graph, table. 4 ref.
(Q general, P general, CI, Ni, Al)

244-Q. (Russian.) **Resistance of Ductile Metals to Brittle Fracture.** G. V. Uzhik. *Doklady Akademii Nauk SSSR,* v. 99, no. 5, Dec. 11, 1954, p. 685-687.

Experimental data on notched tensile tests. Graphs, photograph. 5 ref. (Q26, AY, CN)

245-Q. (Russian.) **Kinetics of Residual Deformation Stipulated by the Self-Diffusion Relaxation of Stresses.** N. S. Fastov. *Doklady Akademii Nauk SSSR,* v. 99, no. 5, Dec. 11, 1954, p. 753-756.

Theoretical data for twisting of a round rod, pure bending of a prismatic rod and contraction of a spherical pore. Equations. 4 ref.
(Q25, N1)

246-Q. (Russian.) **Investigation of the Plastic Properties of Technical Titanium.** L. N. Sokolov, V. P. Eliutin and V. I. Zalesskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 3, March, p. 110-115.

Relation of plasticity, impact strength and tensile strength to temperature. Graphs, tables, micrographs. (Q23, Ti)

247-Q. (Russian.) **Investigation of the Mechanical Properties of Iron-Copper-Graphite Porous Antifriction Alloys.** V. E. Mikriukov and N. Z. Pozdniak. *Moskovskogo Universiteta, Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* v. 9, no. 10, Oct. 1954, p. 49-57.

Strength and hardness tests in relation to proportion of components, porosity and methods of producing the alloys. Tables, graphs, micrographs. 9 ref.
(Q23, Q29, H general, Fe, Cu)

248-Q. (Russian.) **Strength of Cylindrical and Conical Shells of Circular Cross-Section During Simultaneous Action of Axial Compression and External Normal Pressure.** Kh. M. Mushtari and A. V. Sachenkov. *Prikladnaia Matematika i Mekhanika,* v. 18, no. 6, Nov.-Dec. 1954, p. 667-674.

Mathematical treatment. 6 ref. (Q28)

249-Q. **Predicting Fatigue Failures in Aluminum Alloy Structures.** C. R. Smith. *Aero Digest,* v. 70, Jan. 1955, p. 37-41.

Calculating fatigue life from theoretical stress concentration factor and the loading spectrum. Diagram, graphs, tables. 7 ref. (Q7, Al)

250-Q. **The Effect of Dispersions on Creep Properties of Aluminum-Copper Alloys.** W. H. Giedt, O. D. Sherby and J. E. Dorn. *ASME Transactions,* v. 77, Jan. 1955, p. 57-63; disc., p. 62-63.

Properties are primarily dependent on volumetric mean free path of the copper-aluminum particles and independent of minor variations in composition and heat treatment. Graphs, table. 9 ref.
(Q3, Cu, Al)

251-Q. **Fatigue Strength of Flame-Cut Specimens in Bright Mild Steel.** F. Koenigsberger and Z. Garcia-Martin. *British Welding Journal,* v. 2, Jan. 1955, p. 37-41.

Condition of the edges is more important than the quality of the cut. Diagrams, graphs, photographs. 3 ref. (Q7, G22, CN)

252-Q. **The Velocity of Brittle Fracture.** D. K. Roberts and A. A. Wells. *Engineering,* v. 178, Dec. 24, 1954, p. 820-821.

Terminal velocity shown to be a definite fraction of the elastic-wave velocity. Graphs, table. 12 ref. (Q26, ST)

253-Q. Strength in Blistering Heat, Toughness at Arctic Cold. *INCO,* v. 26, Jan. 1955, p. 2-7.

Nickel alloys are key to high performance in modern aircraft. Photographs, diagram. (Q23, T24, Ni)

254-Q. Fatigue Properties of Sintered Copper Compacts. O. J. Dunmore and G. C. Smith. *Iron and Steel Institute, Preprints of Symposium Papers,* Dec. 1954, Group III, p. 61-65 + 2 plates.

Alternating torsion of specimens produced by various pressing and sintering conditions. Diagrams, graphs, micrographs. 3 ref. (Q7, H14, H15, Cu)

255-Q. Energy Stored During Fatigue of Copper. L. M. Clarebrough, M. E. Hargreaves, A. K. Head and G. W. West. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 99-100.

Measurements confirm that energy is stored during fatigue. No evidence of recrystallization was found. Table, graph. 8 ref. (Q7, Cu)

256-Q. Stress Analysis of a Single Crystal in Pure Torsion. Norman Brown. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 134-135.

Mathematical analysis of dislocation behavior and deformation of a hexagonal crystal. Table. 5 ref. (Q25)

257-Q. Contribution of Crystal Structure to the Hardness of Metals. W. Chubb. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 189-192.

Hardness measurements up to 1000° C. on cobalt, iron, titanium, uranium and zirconium show that body-centered-cubic are always the softer structures when they are involved in a transformation. Graphs, diagram. 12 ref. (Q29, M26, Co, Fe, Ti, U, Zr)

258-Q. Plastic Deformation of Germanium and Silicon by Torsion. Earl S. Greiner. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 203-205.

Etch pits show locations of dislocations and reveal planes which were active in slip. Photographs, diagrams, micrographs. 9 ref. (Q24, Ge, Si)

259-Q. Study of a New Mode of Plastic Deformation in Zinc Crystals. J. J. Gilman. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 206-214.

Characteristics of "μ-bands" formed during compression of zinc single crystals. A dislocation model for this phenomenon. Diagrams, graphs, photographs, micrographs. 13 ref. (Q24, M26, Zn)

260-Q. (English.) **Creep of Metal Crystals.** Tore Holth. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 909-911.

Creep appears to be a boundary process in regions of reduced crystal order involving dislocation or the movement of stressed atoms. (Q3)

261-Q. (French.) **Hot Tear Test Specimen for Cast Iron.** Edouard Gabel. *Fonderie,* 1954, no. 107, Dec., p. 4272-4280; disc., p. 4280.

Study of susceptibility to fracture during cooling by using a test piece sensitive to variation of phosphorus content. Diagrams, photographs, graphs, table. 12 ref. (Q26, CI)

262-Q. (French.) **Influence of Silicon, Copper, Zinc, and Magnesium Contents on the Properties of Standardized Light Alloy $AlSi_6Cu_3$.** E. Bertram, W. Patterson and R. Kummerle. *Fonderie,* 1954, no. 107, Dec., p. 4294-4298.

Influence of additions on cracking, casting ability and mechanical properties. Diagrams, graphs, table. (Q general, E general, Si, Cu, Zn, Mg, Al)

263-Q. (German.) **Tensile Tests on Very Long Specimens.** Walter Jäniche and Wilhelm Puzicha. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 589-593.

Increasing test length of steel wire from 0.2 to 19 m. caused a decrease of strength. Table, diagrams, graph. 6 ref. (Q27, CN)

264-Q. (German.) **The Stress Pattern During Necking of the Tensile-Test Specimen.** Alfred Krisch. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 595-598.

Computation of the stress and deformation; conditions for the fracture without external energy due to elastic stresses; practical conclusions applied to large steel structures. Graphs. 14 ref. (Q27, ST)

265-Q. (German.) **Atomistic Concepts of Deformation and Recrystallization Processes in Metals.** Alfred Schäfer. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 621-627.

Mathematical discussion with consideration of vibrations, stresses and lattice distortions. 12 ref. (Q24, N5)

266-Q. (German.) **The Damping Behavior of Stretched Commercial Iron.** Werner Köster, Lothar Bangert and Rolf Hahn. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 569-576; disc., p. 756-758.

Determination of damping properties of cold worked iron between 20 and 400° C; explanation of maxima at 40 and 200° C. Table, graphs, micrograph, diagrams. 31 ref. (Q9, Fe)

267-Q. (German.) **Investigations of the Crystal Boundaries in Deformed Metals, Especially by Microhardness Measurements.** H. E. Tuchschmid. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 12, Dec. 1954, p. 382-415.

Influence of grain boundary precipitation on work hardening of 18-8 steel and an aluminum-magnesium alloy. Diagrams, tables, micrographs, graphs, X-ray diffraction patterns. 68 ref. (Q24, Q29, M26, SS, Al, Mg)

268-Q. (German.) **Stress Measurements on Cast Iron.** Heinz Schlechtweg. *Zeitschrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 690-694.

Mathematical considerations in the evaluation of stress measurements. Tables. 6 ref. (Q25, CI)

269-Q. (German.) **Investigations on the Load-Dependence of Vickers Microhardness. II.** Helmut Bückle. *Zeitschrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 694-701.

Effect of bulges around impressions on hardness reading. Diagrams, micrographs, interference pictures, graphs. 12 ref. (Q29)

270-Q. (Polish.) **Analysis of Stress Distribution in Hydraulic Press Cylinders With the Use of Resistance Wire Strain Gauges.** A. Karamara, M. Misiag and J. Wozniacki. *Prace Instytutu Odlewnictwa,* v. 4, no. 2, 1954, p. 155-173.

Stress analysis methods for cast iron; conversion formulas for calculating stresses. Diagrams, circuit diagrams, tables, graph 12 ref. (Q25, CI)

271-Q. (Russian.) **Concentration of Stresses During Elasto-Plastic Deformations.** V. M. Panferov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 4, Apr., p. 47-66 + 2 plates.

Mathematical analysis. Graphs, micrographs. 8 ref. (Q21, Q24)

272-Q. (Russian.) **Change of Hardness of Pure Metals During Heating.** M. G. Lozinskii and S. G. Fedotov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 4, Apr., p. 80-85 + 1 plate.

Measuring equipment and techniques. Microstructure. Photographs, micrographs, graphs. 22 ref. (Q29, M27, W, Co, Fe, Cu, Ti, Mo, Al, Ni)

273-Q. (Russian.) **Some Peculiarities of Diffusion Plasticity During the Relaxation of Stresses in Metals.** I. A. Oding and V. S. Ivanova. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 5, May, p. 81-90.

Temperature relationship; effect of aging and quenching. Tables, graphs, diagrams. 16 ref. (Q23, Q25, N7, ST)

274-Q. (Russian.) **Influence of Preliminary Plastic Deformation on the Relaxation of Stress in Pure Metals.** B. M. Rovinskii and V. G. Liuttsau. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 6, June, p. 57-60.

Experimental data for aluminum and copper tested at room temperature. Graphs, tables. 3 ref. (Q24, Q25, Al, Cu)

275-Q. (Russian.) **Plastic Deformation of Metals Under Static Loading and Standard Temperature.** M. V. Klassen-Nekliudova. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 7, July, p. 87-96 + 4 plates.

Possible mechanisms of plastic deformation. Diagrams, micrographs. 22 ref. (Q24)

276-Q. (Russian.) **Criterion of Strength in the Case of Brittle Fracture and Plane-Stressed Condition.** N. N. Davidenkov and A. N. Stavrogin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 8, Aug., p. 101-109.

Glass and plaster test specimens used in developing the theories. Graphs, diagrams, table. 7 ref. (Q26, Q23)

277-Q. (Russian.) **Contemporary Views on the Mechanisms of Plastic Deformation and Fracture During the Creep of Metals.** I. A. Oding. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 8, Aug., p. 110-118, 1 plate.

Survey of the most popular theories. Micrographs, graphs, diagram. 13 ref. (Q3, Q24)

278-Q. (Russian.) **Correlation Between Composition, Temperature and Strength for Alloys of the Aluminum-Magnesium System.** I. I. Kornilov and L. I. Priakhina. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 9, Sept., p. 85-89.

Solubility curves and various strength tests. Graphs, table. 9 ref. (Q23, N12, Al, Mg)

279-Q. (Russian.) **Physico-Chemical Phenomena in the Deformation of Metals.** V. I. Likhtman. *Uspekhi Fizicheskikh Nauk,* v. 54, no. 4, Dec. 1954, p. 587-618.

Creep of monocrystals; electrocapillary effect; influence of surrounding medium on mechanical properties of semicrystalline metals. Graphs, tables. 32 ref. (Q24, Q3, Au, Ag, Tl, Pb, Zn, Te, Pt)

280-Q. (Russian.) **Separate Influence of Structural Factors on the Cyclic Strength of Steel.** I. L. Mirkin and E. D. Tsypkina. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 12, Dec. 1954, p. 2209-2216.

Effect of ferrite grain size, preliminary hardening and composition. Tables. 15 ref. (Q23, ST)

281-Q. (Russian.) **Single Statistical Theory of the Strength of Solid Bodies. III.** S. D. Volkov. *Zhurnal Tekhnicheskoi Fiziki,* v. 24, no. 12, Dec. 1954, p. 2250-2260.

Influence of micro and macro stresses on mode of fracture. Graphs. 20 ref. (Q23, Q25, Al, Mg)

282-Q. (Book.) **Analysis of Deformation.** Keith Swainger, v. II. *Experiment and Applied Theory.* 365 p. 1954. Chapman & Hall Ltd., 37 Essex St., London, W.C.2, England. $9.80.

An examination of the available experimental evidence for the equilibrium deformation of solids having various boundary conditions. (Q24)

283-Q. (Book.) **S.S. Clan Alpine Static Experiments, Report No. R. 7** (Structural Tests in Still Water on Riveted Dry Cargo Ship). Admiralty Ship Welding Committee. 141 p. 1953. Her Majesty's Stationery Office, London, England. $6.75.

Stress response to various conditions of loading. (Q25, K13)

284-Q. (Book.) **S.S. Ocean Vulcan Sea Trials, Report No. R. 10** (Loaded Condition). Admiralty Ship Welding Committee. 200 p. 1953. Her Majesty's Stationery Office, London, England. $9.00.

Magnitude of acceleration and bending moments and variations of hydrostatic pressure along the ship. (Q25, K general)

285-Q. (Book.) **S.S. Ocean Vulcan Sea Trials, Report No. R. 11** (Ballast Condition). Admiralty Ship Welding Committee. 136 p. 1954. Her Majesty's Stationery Office, London, England. $6.25.

Analysis of stresses along the ship showing combinations of various actions causing highest stress amidships. (Q25, K general)

286-Q. (Book.) **S.S. Ocean Vulcan Static Experiments, Report No. R. 6** (Structural Tests in Still Water on Welded Dry Cargo Ship). Admiralty Ship Welding Committee. 165 p. 1953. Her Majesty's Stationery Office, London, England. $6.75.

Changes in stresses amidships due to changes in loading. (Q25, K general)

287-Q. (Book.) **Strength of Materials.** Joseph Marin and John A. Sauer. 2nd Ed. 518 p. 1954. Macmillan Company, 60 Fifth Ave., New York 11, N. Y. $6.75.

The mechanics of materials and its application to simple problems of design. (Q23)

288-Q. **Elastic Constants and Coefficients of Thermal Expansion of Piping Materials Proposed for 1954 Code for Pressure Piping.** Rudolph Michel. *ASME, Transactions,* v. 77, Feb. 1955, p. 151-157; disc., p. 157-159.

Data for ferrous and nonferrous materials recommended for pressure piping. Tables, graphs. 55 ref. (Q21, P11)

289-Q. **In-Plane Bending Properties of Welding Elbows.** P. L. Vissat and A.J. Del Buono. *ASME, Transactions,* v. 77, Feb. 1955, p. 161-171; disc., p. 171-175.

Strain-gage investigation on heavy-wall "Weld-Ells"; results compared with theoretical calculations. Graphs, photographs, tables, diagrams. 16 ref. (Q25, K general, CN)

290-Q. **On the Representation of Rheological Results With Special Ref-**

erence to Creep and Relaxation. P. Feltham. *British Journal of Applied Physics,* v. 6, Jan. 1955, p. 26-31.

Accounts for characteristic similarities in stress relaxation and creep behavior of materials on basis of generalized statistical model. Graphs. 38 ref. (Q3, Al)

291-Q. Correlations of Rupture Data for Metals at Elevated Temperatures. Raymond L. Orr, Oleg D. Sherby and John E. Dorn. *California, University, Institute of Engineering Research,* Series no. 22, Technical Report no. 27, July 1, 1953, 25 p. + 5 plates. (Available as PB 111348, *U. S. Department of Commerce, Office of Technical Services,* Washington, D. C. $1.00.)

Data for aluminum, beryllium, titanium, nickel, niobium, molybdenum and several alloys. Graphs, table 19 ref.
(Q4, Al, Be, Ti, Ni, Nb, Mo)

292-Q. Theory of Plasticity: A Survey of Recent Achievements. I-II. William Prager. *Engineer,* v.199, Jan. 21, 1955, p. 81-83; Jan 28, 1955, p. 116-118.

Stress analysis of structures; plastic considerations. Diagrams, photograph, graphs. (Q23, Q25)

293-Q. The Ultimate Strength of Thick-Walled Cylinders Subjected to Internal Pressure. I. Apparatus for Producing Very High Pressures. II. Test Results and Their Relation to Ultimate-Strength Equations. B. Crossland and J. A. Bones. *Engineering,* v. 179, Jan. 21, 1955, p. 80-83; Jan. 28, 1955, p. 114-117.

Experiments verify Manning's theory for ultimate bursting pressures. Relation of type of fracture to tension and torsion properties. Photographs, diagrams, graphs, tables. 15 ref. (Q23, Q1, Q27, CN)

294-Q. Properties of Cast Iron at Elevated Temperatures. J. R. Kattus. *Foundry,* v. 83, Feb. 1955, p. 96 + 6 pages.

Load carrying ability from 700 to 1000° F. as influenced by composition and structure. Graphs, tables. 27 ref. (Q23, CI)

295-Q. The Effect of Internal Oxidation on the Fatigue Properties of Copper Alloys. J. W. Martin and G. C. Smith. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 153-165 + 2 plates.

Internal oxidation reduced fatigue life of polycrystalline copper but increased that of single crystal specimens. Diagram, graphs, micrographs. 13 ref. (Q7, R2, Cu)

296-Q. The Influence of Sub-Structure on the Slip Observed in Pure Aluminium and Some Aluminium Alloys When Subjected to Fatigue Stresses. P. J. E. Forsyth and C. A. Stubbington. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 173-175 + 3 plates.

Tests at room and subzero temperatures show that fatigue stresses promote self-annealing and polygonization. Table, diagrams, micrographs. 4 ref. (Q7, Q25, Al)

297-Q. A Note on the Influence of Grain-Boundary Flow in the Creep of a Lead-0.5% Tin Alloy. P. Brock. *Institute of Metals, Journal,* v. 83, Jan. 1955, p. 191 + 1 plate.

Effects of grain size and stress on creep rate and mechanism. Graph, micrographs. 3 ref. (Q3, Pb)

298-Q. Some Experiments on the Alternating Stress Fatigue of a Mild Steel and an Aluminium Alloy at Elevated Temperatures. P. G. Forrest and H. J. Tapsell. *Institution of Mechanical Engineers, Proceedings,* v. 168, no. 29, 1954, p. 763-772; disc., p. 772-774.

Tests made at several speeds between 10 and 8000 cycles per min. on a normalized 0.17% carbon steel at air temperature of 400, 450 and 500° C. and on an aluminum alloy, in a fully softened condition, at 200° C. Tables, graphs, photographs. 14 ref. (Q7, CN, Al)

299-Q. The Fatigue Strength Under Bending, Torsional and Combined Stresses of Steel Test Pieces With Stress Concentrations. R. C. A. Thurston and J. E. Field. *Institution of Mechanical Engineers, Proceedings,* v. 168, no. 31, 1954, p. 785-792; disc., p. 793-796.

Intrinsic and V-notched fatigue strength under various combinations of bending and torsion. Diagrams, graphs, tables, 10 ref. (Q7, ST)

300-Q. Determination of Residual Stresses in Lightly Rolled Thin Strip. B. B. Hundy. *Iron and Steel Institute, Journal,* v. 179, Jan. 1955, p. 23-29.

Residual stresses increase with amount of reduction. Stress distribution is different for copper and steel. Graphs. 20 ref. (Q25, Cu, CN)

301-Q. Analysis of the Effect of Various Factors on Metal Transfer and Wear Between Specimen Pairs of Same Metal and Same Shape. I. The Basic Scheme of Formulation of Metal Transfer and Wear. II. Effect of the Surrounding Atmosphere. I-Ming Feng. *Journal of Applied Physics,* v. 26, Jan. 1955, p. 24-32.

Theoretical analysis. Graphs. 13 ref. (Q9)

302-Q. Elastic Description of a High-Amplitude Spherical Pulse in Steel. William A. Allen and Werner Goldsmith. *Journal of Applied Physics,* v. 26, Jan. 1955, p. 69-74.

Calculation of effect of cylindrical charge of high explosive detonated in intimate contact with a steel plate. Graphs. 24 ref. (Q21)

303-Q. Some Fundamental Experiments on High Temperature Creep. J. E. Dorn. *Journal of the Mechanics and Physics of Solids,* v. 3, Jan. 1955, p. 85-116 + 4 plates.

Theoretical analysis of published experimental data. Graphs, micrographs, tables, X-ray diffractograms. 57 ref. (Q3)

304-Q. Load-Carrying Capacities for Circular Plates of Perfectly-Plastic Material With Arbitrary Yield Condition. H. G. Hopkins and A. J. Wang. *Journal of the Mechanics and Physics of Solids,* v. 3, Jan. 1955, p. 117-129.

Stress analysis of material that obeys an arbitrary yield condition and associated flow rule. Diagrams, graphs. 9 ref. (Q25)

305-Q. A Theory of the Tensile and Compressive Textures of Face-Centred Cubic Metals. J. F. W. Bishop. *Journal of the Mechanics and Physics of Solids,* v. 3, Jan. 1955, p. 130-142.

Hypothesis to account for different textures observed under similar straining conditions by metals of same lattice type. Diagrams. 30 ref. (Q24)

306-Q. A Theory of the Plastic Yielding Due to Bending of Cantilevers and Beams. II. A. P. Green. *Journal of the Mechanics and Physics of Solids,* v. 3, Jan. 1955, p. 143-155 + 2 plates.

Effect of weak end support under conditions of plane stress. Diagrams, tables, graphs, photographs. 5 ref. (Q5, Q25)

307-Q. The Plastic Bending and Twisting of Square Section Members. M. C. Steele. *Journal of the Mechanics and Physics of Solids,* v. 3, Jan. 1955, p. 156-166.

Stress analysis of long prismatic member acted on by combinations of bending moments and torques of such a magnitude as to render member just fully plastic. Diagrams, graphs, table. 6 ref. (Q5, Q25)

308-Q. Metallic Friction and Lubrication by Laminar Solids. A Review of Current Theories. Ernest Koenigsberg and V. R. Johnson. *Mechanical Engineering,* v. 77, Feb. 1955, p. 141-147.

Analysis of validity of current knowledge and hypotheses. Diagrams, graphs. 48 ref. (Q9)

309-Q. The Effect of Zinc in Aluminium-Silicon-Copper Casting Alloys. F. H. Smith. *Metallurgia,* v. 51, no. 303, Jan. 1955, p. 24-28.

Up to 3% zinc was shown to have no harmful effect on room temperature mechanical properties. Tables, graphs, 9 ref.
(Q general, Al, Si, Cu, Zn)

310-Q. Micro-Indentation Hardness Testing. Variation of Scatter of Results with Load. B. W. Mott and S. D. Ford. *Metal Treatment and Drop Forging,* V. 22, Jan. 1955, p. 9-12.

Survey of range of scatter of hardness values of copper and steel specimens recorded at loads varying from 25 to 2500 g. Tables, graphs. 5 ref. (Q29, ST, Cu)

311-Q. Dislocation Energies and Choice of Slip Plane in Face Centred Cubic Metals. A. J. E. Foreman and W. M. Lomer. *Philosophical Magazine,* v. 46, 7th ser., no. 372, Jan. 1955, p. 73-76.

Analysis of mode of deformation of metal crystal. Graph. 6. ref. (Q24)

312-Q. Point Defects and the Release of Energy from Deformed Nickel. J. F. Nicholas. *Philosophical Magazine,* v. 46, 7th ser., no. 372, Jan. 1955, p. 87-97.

Theoretical and experimental determination of activation energy for migration of defects. Graphs. 10 ref. (Q24, P13, Ni)

313-Q. Apparatus for Studying Friction and Sliding Electrical Contacts. D. G. Flom. *Review of Scientific Instruments,* v.26 Jan. 1955, p. 1-4.

Kinetic friction is recorded by a sensitive strain gage system. Photographs, diagram, graphs. (Q9, Q25)

314-Q. Friction Apparatus for Very Low-Speed Sliding Studies. F. Heymann, E. Rabinowicz and B. G. Rightmire. *Review of Scientific Instruments,* v. 26, Jan. 1955, p. 56-58.

Device eliminates stick-slip vibration. Diagrams, charts. 5 ref. (Q9)

315-Q. Where Heat Is King. I-II. Alan Levy. *Steel,* v. 136, Jan.31, 1955, p. 86-89; Feb. 7, 1955, p.146-148, 151-152.

Properties of available high-temperature alloys; applications. Photographs, graph, tables.
(Q general, SG-h)

316-Q. The Correlation of High Temperature Rupture Data For Niobium. Raymond L. Orr and Douglas W. Bainbridge. *U. S. Department of Commerce, Office of Technical Services,* PB 111349, July 1953, 5 p. $1.00.

Data for tests at 1144° K. and stresses from 18,000 to 25,000 psi. correlated with data for 1255° K. Table, graph. 3 ref. (Q4, Cb)

317-Q. Inelastic Behavior of Ductile Members Under Dead Loading. M. E. Clark, H. T. Corten and O. M. Sidebottom. *University of Illinois Bulletin (Engineering Experiment Station Bulletin No.* 426,) v. 52, no. 16, Oct. 1954, 48 p.

Time effects associated with deadloading of steel and aluminum beams. Graphs, photographs, diagrams, micrograph. 53 ref. (Q23, CN, Al)

318-Q. Transition Temperature Behavior of Pressure Vessel Steels. L. J. McGeady. *Welding Journal,* v. 34, Jan. 1955, p. 1S-11S.

Notched-bar behavior of low carbon plate steels meeting ASTM specifications. Tables. 55 ref. (Q23, CN)

319-Q. Blistering and Embrittlement of Pressure Vessel Steels by Hydrogen. G. A. Nelson and R. T. Effinger. *Welding Journal,* v. 34, Jan. 1955, p. 12S-21S.

Mechanisms of hydrogen damage; effects of temperature and pressure; prevention of damage to pressure vessels. Graph, table, micrographs, photographs, diagram. 9 ref. (Q23, ST)

320-Q. Studies of the Biaxial Fatigue Properties of Pressure Vessel Steels. C. E. Bowman and T. J. Dolan. *Welding Journal,* v. 34, Jan. 1955, p. 51S-59S.

Effect of welding, notches, attachments and fabrication on plastic bi-axial fatigue properties. Photographs, tables, diagrams, graphs. 7 ref. (Q7, ST)

321-Q. A New Criterion of Brittleness and Plasticity of Metals. G. V. Uzhik. *Henry Brutcher Translation no. 2907,* 4 p. Henry Brutcher, Altadena, Calif. (From *Doklady Akademii Nauk SSSR,* v. 68, no. 6, 1949, p. 1037-1039.)

Previously abstracted from original. See item 62-Q, 1950. (Q23)

322-Q. Cracks in Tube Bends. S. Berg. *Henry Brutcher Translation no.* 3113 8 p. Henry Brutcher, Altadena, Calif. (Condensed from *BWK (Brennstoff-Warme-Kraft),* v. 4, no. 12, 1952, p. 413-415.)

Previously abstracted from original. See item 114-Q, 1953. (Q5, ST, CI)

323-Q. On the Nature of Weld Hot Cracking. B. I. Medovar. *Henry Brutcher Translation no.* 3400, 29 p. Henry Brutcher, Altadena, Calif. (From *Avtomaticheskaya Svarka,* v. 7, no. 4, 1954, p. 12-28.)

Review of American and Soviet work over past two years; applicability of Bochvar's theory regarding hot shortness of cast metals; mechanisms and factors involved in cracking. Micrographs, diagrams, graph, table, phase diagram. 23 ref. (Q26, K general, SS, AY, Sn)

324-Q. (French.) **Effect of Transformation Conditions on the Mechanical Properties of Steel Plate With Ultimate Strength of 40 to 50 kg. per mm².** Hocquet. *Centre de Documentation Sidérurgique, Circulaire de'Informations Techniques,* v. 11, no. 12, 1954, p. 2323-2342.

Results of investigation of tensile strength, elongation, and elastic limit of killed and rimmed steels. Graphs. (Q23, CN)

325-Q. (French.) **Utilization of Networks for the Experimental Study of Elastic and Plastic Phenomenon.** Pierre Dantu. *Comptes rendus,* v. 239, no. 25, Dec. 20, 1954, p. 1769-1771.

Photoelastic technique for three-dimensional problems. Stress patterns. (Q25)

326-Q. (French.) **Photoelastometric Study of a Tri-Dimensional Notch in Torsion.** J. Aubaud. *Recherche Aéronautique,* 1954, no. 42, Nov.-Dec., p. 13-16.

Solidification of stresses in polyester resin. Photographs, diagrams. 4 ref. (Q25, Q1)

327-Q. (French.) **Creep Test in Controlled Atmosphere.** J. Poulignier and J. Ramain. *Recherche Aéronautique,* 1954, no. 42, Nov.-Dec., p. 45-49.

Recording apparatus and atmosphere generating equipment. Photographs, diagrams. 2 ref. (Q3)

328-Q. (French.) **Brittle Fractures and Strength in the Thickness Direction of Steel.** W. Soete. *Revue de métallurgie,* v. 51, no. 12, Dec. 1954, p. 813-822; disc., p. 823.

Notched-bar tests in which cracks appear parallel to the principal stress show that a triaxial stress state no longer exists. A banded structure with low strength in the thickness direction explains this behavior. Photographs, graphs, table, diagrams. (Q26, Q23, CN)

329-Q. (French.) **Polygonization of High Purity Iron.** J. Talbot, C. de Beaulieu and G. Chaudron. *Revue de métallurgie,* v. 51, no. 12, Dec. 1954, p. 839-844.

Polygonization appears at lower temperatures with higher purity and is a stable state in cold worked iron. Micrographs, photographs. 9 ref. (Q24, Fe)

330-Q. (French.) **Commission for Studying the High Temperature Metals of the IRSID. Properties of 0.6% Cr and 0.6% Mo, 2.25% Cr and 1% Mo, and 22% Cr and 18% Ni Steels.** G. Delbart and A. Constant. *Revue de métallurgie,* v. 51, no. 12, Dec. 1954, p. 845-868.

Rupture and creep data for times up to 20,000 hr. Graphs, micrographs, tables, photographs. (Q3, Q4, AY, SS)

331-Q. (German.) **Theory of Internal Damping of Vibrating Solids.** Kurt Voelz. *Abhandlungen der Braunschweigischen Wissenschaftlichen Gesellschaft,* v. 6, 1954, p. 126-165.

Theories of Maxwell, Kelvin, Prandtl and Eyring; damping independent of frequency; true relaxation phenomena. Graphs, diagrams. 35 ref. (Q8)

332-Q. (German.) **Cast Iron With Nodular Graphite as a Material for Mechanically, Thermally, and Chemically Stressed Castings.** Helmut Timmerbeil. *Giesserei,* v. 42, no. 1, Jan. 6, 1955, p. 7-15.

Damping capacity of the graphite; improvement by thermal and chemical-thermal treatments; flame-hardening of surface to increase wear resistance; heat resistance and strength properties of alloyed nodular cast iron. Graphs, micrographs, photographs. 7 ref. (Q8, Q general, J2, CI)

333-Q. (German.) **Effect of Cold Working and Ageing on the Tensile Strength and Toughness of Air-Refined Low Carbon Special Steels.** Alfred Kruger. *Stahl und Eisen,* v. 74, no. 27, Dec. 30, 1954, p. 1757-1766.

Forming characteristics of oxygen-steam and oxygen-air blown steels compared with regular process bessemer, openhearth, and electric rimmed and killed steels. Tables, graphs. 16 ref. (Q23, D3, CN)

334-Q. (German.) **Relation Between Structure and Behavior of Austenitic Chromium-Molybdenum-Nickel Steels in Long-Time Tests at Elevated Temperatures.** Karl Bungardt and Heribert Sychrovsky. *Stahl und Eisen,* v. 75, no. 1, Jan. 13, 1955, p. 25-39 + 2 plates.

Effects of molybdenum, columbium and nickel contents; type and degree of prior treatments on high temperature mechanical properties. Tables, micrographs, graphs, 25 ref. (Q general, SS)

335-Q. (German.) **Theory and Application of Photo-Elasticity in the Elastoplastic Field.** R. Hiltscher. *VDI Zeitschrift,* v. 97, no. 2, Jan. 11, 1955, p. 49-58.

Development of photo-elastic method; expansion of flow range and its effect on stress distribution in elastic ranges for two-dimensional states of stress and deformation; limitation of three-dimensional problems to flow-range determination. Graphs, table, diagrams, stress patterns. 13 ref. (Q25)

336-Q. (Russian.) **Investigation of the Structure of Grains in Fractures of Unmodified and Modified Cast Irons.** A. V. Bobrov and S. T. Kiselev. *Liteinoe Proizvodstvo,* 1954, no. 9, Dec., p. 20-22.

Effects of grain size in gray and magnesium treated irons. Micrographs, refractograms. 3 ref. (Q26, M27, CI)

337-Q. (Russian.) **Dependence of the Strength of Threaded Joints on the Hardness of the Material in the Bolts and Pins.** A. I. Iakushev. *Vestnik Mashinostroeniia,* v. 34, no. 12, Dec. 1954, p. 3-6.

Chromium-nickel steel is recommended for static loading, with a hardness of Rockwell C-36 and up and for dynamic loading, with a hardness not exceeding Rockwell C-32 to 36. Tables, diagrams, graphs. (Q28, Q23, AY)

338-Q. Graphical Representation of the Spherical Propagation of Explosive Pulses in Elastic Media. Werner Goldsmith and William A. Allen. *Acoustical Society of America, Journal,* v. 27, Jan. 1955, p. 47-55.

Data from IBM calculations for displacements, velocities and stresses generated in a metal by an explosion. Graphs, tables. 6 ref. (Q25)

339-Q. The Physical and Computing Significance of an Electrical Analogue of Creep and Recovery. A. J. Kennedy. *British Journal of Applied Physics,* v. 6, Feb. 1955, p. 49-58.

A voltage program to simulate the stressing, and the charge taken by the network is integrated and recorded as the creep strain analog. Graphs, table, circuit diagram. 24 ref. (Q3)

340-Q. Mechanical-Metallurgical Improvements in Drill Steel. T. W. Wlodek. *Canadian Mining and Metallurgical Bulletin,* v. 48, no. 514, Feb. 1955, p. 84-90; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 58, 1955, p. 52-58.

Strength and deformation characteristics of drill steels; requirements for various types of ore drilling. Diagrams, table, graphs. 10 ref. (Q23, Q24, T6, TS)

341-Q. Recent Studies of Metallic Friction. F. P. Bowden. *Chartered Mechanical Engineer,* v. 2, Feb. 1955, p. 86-101.

Mechanism of friction, metal transfer, surface temperature of sliding solids. Micrographs, photographs, diagrams, graphs, tables. 25 ref. (Q9)

342-Q. Stress Concentration Factors. Relating Theoretical and Practical Factors in Fatigue Loading. R. B. Heywood. *Engineering,* v. 179, Feb. 4, 1955, p. 146-148.

Causes of discrepancy between theory and practice. Methods for using theoretical data in design. Graphs, diagrams. 6 ref. (Q7)

343-Q. Stresses in Plates With Cracks and Notches. A Theoretical and Experimental Investigation. M. Rothman and D. S. Ross. *Engineering,* v. 179, Feb. 11, 1955, p. 175-180.

Mathematical analysis and photoelastic stress determinations. Graphs, photographs, diagrams. 10 ref. (Q25)

344-Q. The Effect of Fluid Pressure on the Shear Properties of Metals. B. Crossland. *Institution of Mechanical Engineers, Proceedings,* v. 168, no. 40, 1954, p. 935-944 + 2 plates; disc., p. 944-946.

Torsion tests carried out under fluid pressures of 20 to 40 tons per sq.in. Diagrams, photographs, graphs. 15 ref. (Q1)

345-Q. Research Points Way to New Methods of Preventing Galling and Seizing. I-II. E. S. Machlin. *Iron Age,* v. 175, Feb. 10, 1955, p. 91-93; Feb. 17, 1955, p. 104-106.

Influence of film nature and hardness of supporting matrix on behavior of bearings. Tables, graphs. 10 ref. (Q9, Ti, Ag, Fe, Cu, Al)

346-Q. Relationships Between Long and Short-Time Creep and Tensile Properties of a Commercial Alloy. A. Graham and K. F. A. Walles. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 105-120.

Experimental data on Nimonic-80 are used to develop a deformation theory. Graphs, tables. 23 ref. (Q3, Q27, Ni, Cr, Co)

347-Q. Deformation of Iron Crystals by Unidirectional Abrasion. R. P. Agarwala and H. Wilman. *Iron and Steel Institute, Journal,* v. 179, Feb. 1955, p. 124-131 + 2 plates.

Abrasion on different crystal faces caused rotation around various axes. Layers of different crystal structures were found in the deformed region. Diffractograms, graphs, tables. 10 ref. (Q9, Fe)

348-Q. Internal Friction of Metal Single Crystals. Johannes Weertman. *Journal of Applied Physics,* v. 26, Feb. 1955, p. 202-210.

Semiquantitative calculations made of that portion of the internal friction of annealed and moderately cold worked metal single crystals which is due to dislocation motion. Tables, graphs. 22 ref. (Q22)

349-Q. Hydrogen Affects Critical Properties in Commercial Titanium. H. D. Kessler, R. G. Sherman and J. F. Sullivan. *Journal of Metals,* v. 7, Feb. 1955, p. 242-246.

Data indicate that 0.015% is the upper limit for hydrogen in commercial titanium and the alloys Ti-140A and Ti-150A. Vacuum melting and careful processing will meet this requirement. Vacuum annealing may reclaim high hydrogen material. Graphs, micrographs, photograph. 14 ref. (Q general, N8, Ti)

350-Q. Embrittlement of Molybdenum by Neutron Radiation. C. A. Bruch, W. E. McHugh and R. W. Hockenbury. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 281-285.

Transition temperature was increased from −30 to 70° C. due to submicroscopic changes. Diagram, micrographs, graphs, tables. 8 ref. (Q23, P13, Mo)

351-Q. A Study of the Room Temperature Fatigue Properties of Molybdenum. W. L. Bruckart and W. S. Hyler. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 287-290.

Tests on powder-metallurgy and arc-cast wrought molybdenum show good fatigue behavior in both notched and unnotched specimens. Micrographs, tables, graphs, diagram, photographs. (Q7, Mo)

352-Q. Relation of Strength, Composition, and Grain Size of Sintered WC-Co Alloys. J. Gurland and P. Bardzil. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 311-315.

Transverse-rupture strength reaches a maximum for values of free path between carbide particles of 0.3 to 0.6 μ. Tables, graphs, micrographs, photograph. 18 ref. (Q27, M27, C-n, W, Co)

353-Q. Influence of Heat Treatment on the Ductile-Brittle Transition Temperature of Semikilled Steel Plate. R. H. Frazier, F. W. Boulger and C. H. Lorig. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 323-329.

Effects of ferrite grain size on brittleness. Diagram, tables, graphs, micrographs. 9 ref. (Q23, M27, CN)

354-Q. Isoembrittlement in Chromium and Molybdenum Alloy Steels During Tempering. Gopalkrishna Bhat and Joseph F. Libsch. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 330-335.

Data suggest two distinct modes of embrittlement with possible superposition at extended times at 1100 to 1150° F. for chromium steels. Tables, graphs. 17 ref. (Q23, AY)

355-Q. Cold-Rolled Textures of Silicon-Iron Crystals. P. K. Koh and C. G. Dunn. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 401-406.

Effects of orientation on deformation behavior. Table, pole figures, refractogram, diagram. 14 ref. (Q24, Fe, Si)

356-Q. Formation of Cold-Worked Regions in Fatigued Metal. Rayjor Webeler. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 408-411.

Ordered copper-gold wires increased in resistivity by 1 to 2% at liquid nitrogen temperature as a result of fatigue. Diagram, tables. 7 ref. (Q7, Au, Cu)

357-Q. Temper Brittleness of Some Fe-Ni-Cr Alloys. L. D. Jaffe. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 412.

Properties of SAE 3135 bar stock remelted under vacuum. Table, graphs. 7 ref. (Q23, AY)

357-Q. Hypo-Elasticity. C. Truesdell. *Journal of Rational Mechanics and Analysis,* v. 4, Jan. 1955, p. 83-133.

Theory, analysis of stress-strain relationships. Graphs, diagrams. (Q21)

358-Q. On the Concept of Concentrated Loads and an Extension of the Uniqueness Theorem in the Linear Theory of Elasticity. E. Sternberg and R. A. Eubanks. *Journal of Rational Mechanics and Analysis,* v. 4, Jan. 1955, p. 135-168.

Mathematical analysis. Theoretical considerations. Diagram. 22 ref. (Q21)

359-Q. Effect of Temperature on the Tensile Properties of a Commercial and a High-Purity 70-Percent-Nickel-30-Percent-Copper Alloy. William D. Jenkins, Thomas G. Digges and Carl R. Johnson. *Journal of Research, National Bureau of Standards,* v. 54, Jan. 1955, p. 21-36.

Tests made from 75 to 1700° F. on samples of same grain size and structure. Tables, graphs, photographs, micrographs. 10 ref. (Q23, Cu, Ni)

360-Q. Transcrystalline Decohesions Produce by Mechanically Working the Surface of Iron and Steel. Pierre A. Jacquet. *Metal Treatment and Drop Forging,* v. 22, Feb. 1955, p. 55-58.

Study of microfissures in machined surfaces. Micrographs. 5 ref. (Q26, G17, AY, Fe)

361-Q. Deformation Faults in Cold-Worked Metals. G. B. Greenough and E. M. Smith. *Physical Society, Proceedings,* v. 68, no. 421B, Jan. 1955, p. 51-52.

Experimental data for copper and aluminum-silver alloy filings. 4 ref. (Q24, Cu, Al, Ag)

362-Q. The Effect of Bending on the Mechanical Properties of Temper-Rolled Mild Steel. B. B. Hundy and T. D. Boxall. *Sheet Metal Industries,* v. 32, no. 334 Feb. 1955, p. 101-103, 108.

Aging effects explained in terms of modified residual stresses and other factors influencing the degree of strain aging; testing precautions. Graphs. 5 ref. (Q25, Q5, CN)

363-Q. Rockwell Hardness Testing of Sheet Materials. Vincent E. Lysaght. *Sheet Metal Industries,* v. 32, no. 334, Feb. 1955, p. 127-133; disc., p. 133-138.

Factors to be considered in testing various metals in several conditions. Tables, graphs, diagrams. 6 ref. (Q29)

364-Q. Fatigue of Metals—Our Knowledge and the Deficiencies in Our Knowledge. P. L. Teed. *Shell Aviation News,* 1954, no. 198, Dec., p. 16-21.

Influence of repeated stresses under various conditions; understressing, overstressing, cummulative rule. Graphs. 70 ref. (To be continued.) (Q7)

365-Q. Brittle Fracture in Steel. C. P. Oldridge. *Welding and Metal*

Fabrication, v. 23, Feb. 1955, p. 55-60.
Salient points of this vital problem. Photographs, graphs, diagram. (To be continued.) (Q26, Q23, ST)

366-Q. Sigma Phase in Austenitic Stainless Steel Weldments. O. H. Henry, M. A. Cordovi and G. J. Fischer. *Welding Journal,* v. 34, Feb. 1955, p. 75S-81S.
Occurrence of sigma phase and its effects on tensile-impact properties. Tables, photographs, diagram, graphs. (Q23, Q6, M26, SS)

367-Q. Fatigue Strength of Butt Welds in Structural Steels. L. A. Harris, G. E. Nordmark and N. M. Newmark. *Welding Journal,* v. 34, Feb. 1955, p. 83S-96S.
Low-hydrogen electrodes produce joints with best fatigue properties. Tables, diagrams, photographs, graphs. 7 ref. (Q7, K1, CN)

368-Q. Filler-Metal Strengths in Brazed Copper Joints. W. H. Munse and D. C. Crawford. *Welding Journal,* v. 34, Feb. 1955, p. 105S-111S; disc., p. 111S.
Test data for six filler metals at various temperatures. Diagrams, tables, photographs, graph, micrographs. 13 ref. (Q23, K8, Cu)

369-Q. (English.) **Effect of Arsenic, Copper, Tin and Molybdenum on Impact Properties of Steels.** Hiroshi Sawamura and Toshisada Mori. *Kyoto University, Memoirs of the Faculty of Engineering,* v. 16, no. 4, Oct. 1954, p. 205-227.
Charpy tests on forged bars from 47 experimental melts at temperatures up to 900° C. show effects of composition on grain size, hardness, microscopic structures and impact resistance. Tables, diagrams, graphs, micrographs. 18 ref. (Q6, CN)

370-Q. (English.) **Researches on the Fatigue Deformation.** Minoru Kawamoto and Kunio Nishioka. *Kyoto University, Memoirs of the Faculty of Engineering,* v. 16, no. 4, Oct. 1954, p. 228-252.
Deformation during fatigue loading as a function of load, stress distribution and yield properties of the steel. Graphs, tables, diagram. 5 ref. (Q7, CN)

371-Q. (English.) **A Theory of Slip-Band Formation and Work-Hardening in Face-Centred Cubic Metal Crystals.** Taira Suzuki. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 4, Aug. 1954, p. 309-323.
Dislocation source elements remaining in an annealed crystal are sources for dislocation spirals. Diagrams, graphs. 42 ref. (Q24, M26)

372-Q. (English.) **A Note on a Theory of the Uniaxial Ferromagnetic Anisotropy Induced by Cold Work or by Magnetic Annealing in Cubic Solid Solutions.** Satoshi Taniguchi and Mikio Yamamoto. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 4, Aug. 1954, p. 330-332.
Explained by anisotropy energy from anisotropic distribution of solute atoms. Graph. 5 ref. (Q24, P16)

373-Q. (English.) **Production of Single Crystals of Iron-Aluminium Alloys by the Strain-Anneal Method.** Mikio Yamamoto and Ryofu Miyasawa. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 4, Aug. 1954, p. 333-342.
Alloys of less than 6% aluminum studied for best decarburization, elongation working, recrystallization annealing and macro-etching qualities. Tables, diagram. 27 ref. (Q24, Al, Fe)

374-Q. (French.) **Application of Microphotoelastometry to the Study of Plastic Deformation.** Marcel Bonvalet. *Comptes rendus,* v. 240, no. 2, Jan. 10, 1955, p. 157-158.
Tensile tests on metallic specimens coated by ethoxy resin, utilizing the local birefringence of the varnish. (Q25)

375-Q. (French.) **Effect of High-Temperature Oxidation on the Chemical Composition of the Surface of a Nickel-Chromium-Titanium-Aluminium Alloy.** Frima Malamand and Georges Vidal. *Comptes rendus,* v. 240, no. 2, Jan. 10, 1955, p. 186-188.
Spectrographic technique to determine surface impoverishment by selective oxidation by titanium and aluminum. Explains the stress-rupture properties. Graphs. 4 ref. (Q4, R2, Ni, Cr)

376-Q. (French.) **Relationship Between the Structure and Tensile Properties of Sand-Cast Tin Bronzes.** Pierre-Julien Le Thomas. *Fonderie,* 1955, no. 108, Jan., p. 4320-4329.
Rule for determining relationship between alpha-delta structure and tensile properties of tin bronzes; influence of phosphorus. Micrographs, diagrams, tables, graphs. 8 ref. (Q23, M27, Sn, Cu)

377-Q. (French.) **Influence of Iron and Manganese on A-S13 (Alpax) Type Alloys.** Claude Mascré. *Fonderie,* 1955, no. 108, Jan., p. 4330-4336.
Studies methods of combatting injurious influence of iron in aluminum-silicon alloys, and quantitative relationship needed between iron

and manganese. Micrographs, charts, graphs, table. 3 ref. (Q general, M27, Fe, Mn)

378-Q. (French.) **Improvement of the Fatigue and Corrosion Behavior of Piston-Engine Valve Springs.** M. R. Chevalier. *Technique et science aéronautiques,* 1954, no. 5, p. 348-353.

Results of tests on the influence of surface state on fatigue behavior, and on improving protection against corrosion. Micrographs, table, photograph. (Q7, R general)

379-Q. (German.) **Problem of Intrinsic Stresses in Rods Under Static Load.** Hans Bühler. *Archiv für das Eisenhüttenwesen,* v. 26, no. 1, Jan. 1955, p. 51-54.

Effect of static tensile and compression stresses on change of residual stress in normally annealed and refined structural steels. Tables, graphs, diagram. 18 ref. (Q25, CN)

380-Q. (German.) **The Strain-Gage Process. IV. Electrical Measuring Technique.** C. Rohrbach. *Archiv für technisches Messen,* 1955, no. 229, Feb., p. 41-44.

Basic circuits for measuring stresses with a.c. and d.c. currents. Diagrams. 11 ref. (Q25)

381-Q. (German.) **Hardness and Wear Resistance of Electroplated Coatings.** R. Weiner and G. Klein. *Metalloberfläche,* Ausgabe B, v. 7, no. 1, Jan. 1955, p. 1-7.

Correlation between micro-indention hardness, scratch hardness and resistance to abrasion; comparative tests with different plating baths. Tables, graphs. 7 ref. (Q29, Q9, L17)

382-Q. (German.) **TOR-Steel 40 at High Temperatures.** Stephan Soretz. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 1, Jan. 1955, p. 3-7.

Details and results of tensile tests and effects of stresses at various temperatures. Graphs, tables. 5 ref. (Q23, Q27, ST)

383-Q. (German.) **Some Applications of the Cylindrical Shell Theory.** Walter Wuest. *Zeitschrift für angewandte Mathematik und Mechanik,* v. 34, no. 12, Dec. 1954, p. 444-454.

An extension of the theory to open divisions of shells for cases of uniform stress distribution along one direction, and applied to cross-curved leaf and bimetallic cylinder springs. Diagrams, graphs, table. 9 ref. (Q25)

384-Q. (German.) **A New Process for Evaluating Plane Photoelasticity.** L. Föppl. *Zeitschrift für angewandte Mathematik und Mechanik,* v. 34, no. 12, Dec. 1954, p. 454-459.

Orthogonal lines of principal stress are used as coordinate lines to describe the plane state of stress. Graphs. 2 ref. (Q25)

385-Q. (German.) **Comparison of Internal Stresses in Ferromagnetic Metals Determined by X-Ray and Magnetism.** Ludwig Reimer. *Zeitschrift für angewandte Physik,* v. 6, no. 11, Nov. 1954, p. 489-494.

Extension of method of reversible magnetization energy to determine internal stresses in iron reveals good agreement with the internal stresses determined from the line displacements in X-ray recordings. Graphs. 10 ref. (Q25, Ni, Fe)

386-Q. (German.) **Internal Stresses After Plastic Tensile Deformation.** Viktor Hauk. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 33-38.

X-ray measurements on surface of slightly stretched flat steel and aluminum alloy bars. Two types of internal stress are ascribed to elastic anisotropy and heterogeneity in a heterogeneous structure. Tables, micrographs, graphs. 30 ref. (Q25, AY, CN, Al)

387-Q. (German.) **X-Ray Investigations of the Effect of Carbon Content on Internal Bending Stresses in Steel and Iron.** Ludwig Reimer. *Zeitschrift für Metallkunde,* v. 46, no. 1, Jan. 1955, p. 39-42.

Slight plastic bending of pure iron and steel bars with 0.35 and 0.6% carbon reveals an increase of internal stresses with increasing carbon content. Table, diagram, micrograph, graphs. 20. ref. (Q25, Q5, Fe, CN)

388-Q. (Russian.) **Forces of Bonding and the Static Distortions in Crystals of Alloyed Ferrite.** V. A. Il'ina and V. K. Kritskaia. *Doklady Akademii Nauk SSSR,* v. 100, no. 1, Jan. 1, 1955, p. 69-72.

Role of formation of submicroscopic nonhomogeneity in connection with mechanical working and heat treatment. Tables, graphs. 8 ref. (Q24, M26, J general, Fe, Mo, Co, Mn, Nb, V)

389-Q. (Russian.) **Diagram of Composition Versus Heat Resistance for Alloys of the Binary Nickel-Tungsten System.** I. I. Kornilov and P. B. Budberg. *Doklady Akademii Nauk SSSR,* v. 100, no. 1, Jan. 1, 1955, p. 73-75.

Diffusion processes affecting creep; physico-chemical theory of high-temperature strength of solid solutions. Graphs. 8 ref. (Q3, Q23, N1, Ni, W)

390-Q. (Russian.) **Mechanical Properties and Microstructure of Bronzes Br. Ots-10-2 and Br. OS-10-10.** A. A. Iurgenson and N. A. Zernova. *Liteinoe Proizvodstvo,* 1955, no. 1, Jan., p. 24-25.

Microstructural and strength analysis of leaded bronze. Tables, diagrams, graphs, micrographs. 3 ref. (Q23, M27, Cu, Sn, Pb)

391-Q. (Russian.) **Effect of Heat Treatment on Fatigue Strength of Steel During Atmospheric Corrosion.** A. V. Riabchenkov and E. L. Kazimirovskaia. *Vestnik Mashinostroeniia,* v. 35, no. 1, Jan. 1955, p. 69-72.

Case-hardening, normalizing, microstructures. Graphs, table, micrographs. 6 ref. (Q7, J28, J24, R3, ST)

392-Q. (Russian.) **Choice of Structure of Steel for Parts Operating Under Cyclic Stresses.** I. L. Mirkin and E. D. Tsypkina. *Vestnik Mashinostroeniia,* v. 35, no. 1, Jan. 1955, p. 72-75.

Medium-carbon low-alloy steels have structures more resistant to fatigue than low-carbon high-alloy steels. Tables, graphs, sketch. 2 ref. (Q7, M27, AY)

393-Q. (Russian.) **Investigation of the Strength of Solids. II. Relation of Rupture Life to Stress.** S. N. Zhurkov and E. E. Tomashevskii. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 66-73.

Testing techniques. Effect of strain rate and stress on metals and plastics. Oscillograms, circuit diagram, diagrams, graph, table. 16 ref. (Q4, Al, Zn)

394-Q. (Russian.) **Temperature and Grain Size Dependence of Strength of Tungsten Carbide-Cobalt Cermets.** G. S. Kreimer, O. S. Safonova and A. I. Baranof. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 1, Jan. 1955, p. 117-124.

Testing equipment and technique, microstructural characteristics. Graphs, micrographs, tables, diagram. 4 ref. (Q23, M27, W, Co)

395-Q. (Swedish.) **Phenomenon of Hydrogen Embrittlement During Arc Welding.** Tore Norén and Stig-Erik Erikson. *Svetsaren,* v. 19, nos. 2-3, 1954, p. 3-19, 22.

Review of experimental and theoretical data. Graphs, micrographs, photographs. 59 ref. (Q23, K1, ST)

396-Q. (Swedish.) **Derivation of Equation for Equivalent Stresses by the Deviation Hypothesis.** Carl T. Ingwall. *Svetsaren,* v. 19, nos. 2-3, 1954, p. 20-22.

Conditions for start of yield in welded structures as a function of conditions in the tensile test. Graph. (Q27)

397-Q. **Ductility of Vacuum Heat-Treated Molybdenum Wires.** W. E. Few and G. K. Manning. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 343-344.

Low ductility results from slow heating through the range of 3000 to 3300° F. Tables. 2 ref. (Q23, Mo)

398-Q. **Effect of Zinc Content on the Rolling Texture and Annealing Texture of Alpha Brass.** Alfonso Merlini and Paul A. Beck. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 385-393.

Gradual changes in annealing texture explained qualitatively by the oriented growth theory. Graph, tables, pole figures. 15 ref. (Q24, N5, Cu, Zn)

399-Q. **Mechanical Properties of Welded 356 Aluminum Castings.** Walter S. Tenner. *Welding Journal,* v. 34, Feb. 1955, p. 128-136.

Postweld heat treatment permits welding of this alloy. Photographs, tables, micrographs, diagrams. (Q general, K general, Al)

400-Q. **Stress Distribution in Side Fillet Welded Plates.** P. J. Palmer. *British Welding Journal,* v. 2, Feb. 1955, p. 55-60.

Comparison of calculated and measured stresses shows good agreement. Diagrams, graphs. 9 ref. (Q25, K6)

401-Q. **Fatigue Life of Stranded Hook-Up Wire.** Donald C. Alexander. *Wire and Wire Products,* v. 30, Feb. 1955, p. 181-185, 221.

Vibration testing to simulate service conditions; variables which can be controlled. Photographs, tables. (Q7, Al, Cu)

402-Q. (English.) **The Internal Friction of Dilute Alloys of Lead.** J. Weertman and E. I. Salkovitz. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 1-9.

Effects of strain amplitude, temperature and ratio of atom sizes on internal friction, modulus of elas-

ticity and critical shear stress in 0.01 to 0.1% bismuth, tin or cadmium alloys. Diagram, graphs, tables. 27 ref.
(Q22, Q21, Pb, Bi, Sn, Cd)

403-Q. (English.) **The Yield Phenomena, Kink Bands and Geometric Softening in Titanium Crystals.** A. T. Churchman. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 22-29.

Explanation of dicontinuities in stress-strain relationships of titanium containing 0.1 wt.% oxygen and nitrogen. Graphs, micrographs. 26 ref. (Q23, Ti)

404-Q. (English.) **On Deformation by Twinning.** F. C. Frank and N. Thompson. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 30-33.

Distinction between strain due to complete twinning and the macroscopic strain due to formation of a thin lamella. Pole diagrams. 4 ref. (Q24)

405-Q. (English.) **Indentation Figures on Single Crystals.** I. E. Votava, S. Amelinckx and W. Dekeyser. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 89-94.

Explanation of deformation figures observed on cleavage faces of mica and NaCl crystals. Drawings, interferograms, refractograms. 5 ref. (Q24)

406-Q. (English.) **Sub-Grain Formation in Aluminum Deformed at −183°** C. A. Kelly and W. T. Roberts. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 96-97.

X-ray microbeam study of 99.99% pure aluminum. Refractograms. 5 ref. (Q24, Al)

407-Q. (English.) **Electron Mircoscope Study of Slip Bands in Radiation-Damaged Aluminum Crystals.** E. M. Kelly. *Acta Metallurgica,* v. 3, no. 1 Jan. 1955, p. 101-102.

Irradiation and straining at −196° C. increased the amount of slip on a given plane; straining at room temperature showed no effects of irradiation. Micrographs. 2 ref. (Q24, Al)

408-Q. (English.) **Internal Friction in Titanium and Titanium Oxygen Alloys.** H. H. Bleakney. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 103-104.

Shows that stress relaxation across grain boundaries cannot explain rapid drop in modulus of elasticity at elevated temperatures. Tables. 2 ref. (Q21, Q22, Ti)

409-Q. (English.) **Note on the Temperature Dependence of Hardness of the Transition Metal Monocarbides.** J. H. Westbrook. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 104-106.

Comparison of various theoretical expressions and experimental data. Graphs. 17 ref. (Q29)

410-Q. (English.) **Internal Friction of Interstitial Solid Solutions of Oxygen and Nitrogen in Vanadium.** J. T. Stanley and C. A. Wert. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 107-108.

Effects of carbon, nitrogen and oxygen on damping peaks in ductile vanadium. Graphs. 5 ref. (Q22, V)

411-Q. (English.) **A Dislocation Model for the Origin of Fracture Cracks in Metal Crystals.** J. C. Fisher. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 109-110.

Combined movements of screw and edge dislocations can start a crack only if a normal stress is present across the screw dislocation. Diagrams. (Q26)

412-Q. (Russian.) **Equations for the Theory of Plasticity.** V. V. Sokolovskii. *Prikladnaia Matematika i Mekhanika,* v. 19, no. 1, Jan.-Feb. 1955, p. 41-54.

Formulation of basic relations among components of stress and rate of deformation; equations of plane plastic equilibrium and transformation. 3 ref. (Q23)

413-Q. (Pamphlet.) **Study of Hard Coating for Aluminum Alloys.** Cornell Aeronautical Laboratory, Inc. PB 111320 S, 1953, 23 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

Treatments to reduce effects of oxide coatings on fatigue strength; corrosion resistance of treated coatings. (Q7, R general, L14, Al)

414-Q. (Book.) **Fatigue of Aluminum.** R. L. Templin. 59 p. 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Fatigue properties of various alloys and factors to be considered in design applications. (Q7, Al)

415-Q. (Book.) **Report on the Elevated-Temperature Properties of Selected Super-Strength Alloys.** Ward F. Simmons and Howard C. Cross. ASTM Special Technical Publication No. 160. 208 p. 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $3.50.

Graphical summary of high-temperature mechanical properties of

13 alloys with brief descriptions including compositions, heat treatments, and processing data.
(Q general, SG-h)

416-Q. (Book.) **Symposium on Effect of Temperature on the Brittle Behavior of Metals With Particular Reference to Low Temperatures.** ASTM Special Technical Publication No. 158. 474 p. 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Includes 26 papers covering occurrence, theory, and control of brittle fracture of steels and cast iron. Papers are abstracted individually. (Q23, Q26, ST, CI)

417-Q. (Russian.) **Results of Observations of Metal and Alloy Micro-Structures During Deformation Under Tensile Stress at High Temperature.** M. G. Lozinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 10, Oct., p. 3-13 + 2 plates.

Description of method and equipment for testing at temperatures of 400 to 1000° C. Diagrams, photographs, micrographs. 9 ref.
(Q27, M27)

418-Q. (Russian.) **Behavior of a Thin Surface Layer of Metal in a Zone of Stress Concentration.** V. I. Mokeeva and B. M. Rovinskii. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 10, Oct., p. 14-22 + 1 plate.

Interference pattern method of determining yield point and residual deformation. Diagrams, graphs, table. 7 ref. (Q25)

419-Q. (Russian.) **Influence of Chemical Composition of Cast Iron on Wear Resistance of Brake Shoes.** D. T. Zelenskii. *Liteinoe Proizvodstvo,* 1955, no. 2, Feb., p. 7-10.

Influence of carbon, silicon, manganese, phosphorus and sulfur contents; method of casting; optimum hardness. Tables, diagrams, micrographs. 4 ref. (Q9, CI)

420-Q. (Russian.) **Characteristics of "Ultimate Cycles" in the True Stresses.** L. I. Savel'ev. *Vestnik Mashinostroeniia,* v. 35, no. 2, Feb. 1955, p. 14-17.

Interpretation of a diagram of "ultimate cycles" as a means to determine the fatigue characteristics of materials. Tables, graphs, diagrams. 8 ref. (Q7, ST)

421-Q. (Russian.) **Influence of Carbide-Forming Elements on the Annealing Brittleness of Steel.** V. I. Prosvirin and E. I. Kvashnina. *Vestnik Mashinostroeniia,* v. 35, no. 2, Feb. 1955, p. 58-67.

Experimental data on the effects of chromium, manganese, molybdenum, tungsten, columbium, vanadium and titanium carbides. Graphs, diagrams, tables, micrographs. 10 ref. (Q23, M26, ST)

422-Q. (Russian.) **Investigation of Strength of Heat Treated Tool Steel Under Tensile and Compressive Stresses.** Z. M. Koniushko. *Vestnik Mashinostroeniia,* v. 35, no. 2, Feb. 1955, p. 67-69, 73.

Test methods for investigating influence of heat treatment condition on the strength. Tables, diagrams, graphs. 4 ref. (Q23, J general, TS)

423-Q. (Russian.) **Strengths of Bond and Distortions in Crystals of Martensite.** V. K. Kritskaia, G. V. Kurdiumov and N. M. Nodia. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 2, Feb. 1955, p. 177-181.

Limits of elastic deformation in martensite and alpha-iron; effects of carbon content and temperature. Table, graph. 9 ref. (Q21, M26, ST)

424-Q. (Russian.) **Problem of the Physical Nature of Cavitational Fracture.** L. A. Glikman, V. P. Tekht and Iu. E. Zobachev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 2, Feb. 1955, p. 280-298 + 1 plate.

Metallographic, X-ray and microhardness study of carbon and austenitic steels, high strength cast iron and brass. Photograph, micrographs, graphs, tables. 9 ref.
(Q26, ST, CI, Cu)

425-Q. (Russian.) **Hardness and Stress in a Plastically Deformed Body.** A. M. Rozenberg and L. A. Khvorostukhin. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 2, Feb. 1955, p. 313-322.

Shows that the numerical value of indentation hardness is a function of total deformation of the material; relation to machinability. Graphs, table, diagram. 10 ref.
(Q29, Q25, G17, ST, CI, Al, Cu)

426-Q. **The Yield Rate of Mild Steel.** Frederick Forscher. *ASTM Bulletin,* 1955, no. 205, Apr., p. 63-67.

Dependence of the yield rate on stress and temperature. Effect of nucleation and growth of Lüders' bands. Tables, graphs, diagrams, photograph. 5 ref. (Q23, Q24, ST)

427-Q. **A Study of the Thermal Stability of Materials Used in Sintering Machine Pallets.** J. B. Caine. *Blast Furnace and Steel Plant,* v. 43, Mar. 1955, p. 315-319.

Tests on three cast irons and two cast steels at temperatures of 1250, 1450 and 1650° F. Tables, graph, micrographs. (Q23, CI)

428-Q. Some Flexural Fatigue Tests on 75S-T Aluminium Alloy Sheet Specimens With Drilled Holes. J. M. Finney and J. Y. Mann. *Commonwealth of Australia, Dept. of Supply, Research and Development Branch,* A.R.L./S.M. 213, Nov. 1954, 8 p. + 8 plates.

Tests on unmatched specimens of clad and unclad 75S-T aluminum alloy and unclad 75S-T aluminum alloy with various stress concentrators. Tables, diagrams, photograph, graphs. 6 ref. (Q7, Al)

429-Q. Plastic Strain and Stress Relations at High Temperatures. I. A. E. Johnson, N. E. Frost, and J. Henderson. *Engineer,* v. 199, Mar. 18, 1955, p. 366-369.

Studies of the plastic-strain-stress relations for a 0.17% C steel at 350 and 450° C., and an RR59 aluminum alloy at 20, 150 and 200° C. under both simple and general complex stress loading conditions. Graphs, tables. (To be continued.) (Q27, CN, Al)

430-Q. The Comet and Design Against Fatigue. W. J. Duncan. *Engineering,* v. 179, Feb. 18, 1955, p. 196-200.

Attempts to formulate some of the important technical conclusions of the Comet inquiry and reviews subject of the fatigue of metals and its implications for engineering design. (Q7)

431-Q. The Thickness of High-Temperature Steam Pipes. Design Stresses for Creep Conditions. J. S. Blair. *Engineering,* v. 179, Feb. 18, 1955, p. 205-209.

Design formulas for temperatures from about 950 to 1070° F. Graphs, tables. (Q3, AY)

432-Q. The Energy Theorems of Structural Analysis. I. Definitions and Fundamentals. II. Derivation and Discussion of the Theorems. E. H. Brown. *Engineering,* v. 179, Mar. 11, 1955, p. 305-308; Mar. 18, 1955, p. 339-342.

Study of the various theorems of strain energy and complementary energy, with their physical meanings, conditions and limitations. Considers structures with either linear or nonlinear load/displacement curves. Graphs. 13 ref. (To be continued.) (Q25)

433-Q. Sonic Methods for Measuring Young's Modulus of Elasticity of Porcelain Enamel-Metal Composites. Robert E. Cowan. *Finish,* v. 12, Apr. 1955, p. 40-42, 62-64.

Equipment and test methods. Graphs, diagrams, photographs, table. 10 ref. (Q21, L27)

434-Q. How Titanium Alloys Behave at High Temperatures. D. R. Luster and B. L. Shakely. *Iron Age,* v. 175, Mar. 24, 1955, p. 96-99.

Determination of notch, creep and fatigue characteristics at temperatures up to 100° F. Graphs, table. (Q23, Q3, Q7, Ti)

435-Q. Trace Impurities. Effect on the Properties of Iron. N. P. Allen. *Iron & Steel,* v. 28, Mar. 1955, p. 85-88.

Effects on mechanical properties including ductility, tensile and impact properties. Graph, photographs, tables. (Q23, Q6, Fe)

436-Q. Causes of Variable Creep Strength in Basic O.H. Carbon Steel. W. E. Bardgett and M. G. Gemmill. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 211-219.

Effect of manufacturing variables on scatter of results obtained under similar testing conditions in mild steels. Shows that soluble aluminum present in the steel is a paramount factor in variable creep behavior. Tables, graphs. 9 ref. (Q3, CN)

437-Q. Anisotropic Loading Functions for Combined Stresses in the Plastic Range. L. W. Hu and Joseph Marin. *Journal of Applied Mechanics,* v. 22, Mar. 1955, p. 77-85.

Validity of loading functions for 24S-T in bi-axial tension. Diagrams, graphs, table. 20 ref. (Q27, Al)

438-Q. Effect of Low Temperatures on the Mechanical Properties of a Commercially Pure Titanium. Glenn W. Geil and Nesbit L. Carwile. *Journal of Research, National Bureau of Standards,* v. 54, Feb. 1955, p. 91-101.

Results of tests on notched and unnotched tensile specimens at −196 to +100° C. Table, micrographs, graphs. 10 ref. (Q general, Ti)

439-Q. Magnetic Measurement of the Hardness of Metals. D. Hadfield. *Metal Treatment and Drop Forging,* v. 22, Mar. 1955, p. 91-96.

Use of the magnetic characteristics of metals and alloys to define their hardness. Testing methods. Graphs. (To be continued.) (Q29)

440-Q. Metallurgical Aspects of the Comet Inquiry. Tom Bishop. *Metal Treatment and Drop Forging,* v. 22, Mar. 1955, p. 113-118.

Fatigue and other tests to ascertain cause of failure. Photographs, diagram, graph. (Q7)

441-Q. Ultrasonic Attenuation in Zinc Single Crystals While Undergoing Plastic Deformation. George A. Alers. *Physical Review,* v. 97, ser. 2, Feb. 15, 1955, p. 863-869.

Measurements were made at constant stress. The attenuation of transverse waves was very sensitive to the deformation. Diagrams, graphs. 5 ref. (Q24, Zn)

442-Q. The Embrittlement of Steel by Hydrogen. Winifred A. Bell. *Product Engineering,* v. 26, Mar. 1955, p. 189-192.

Effects of hydrogen penetration. Suggestions to minimize hydrogen attack. Photographs, graphs. (Q23, ST)

443-Q. Friction Between Unlubricated Metals: A Theoretical Analysis of the Junction Model. A. P. Green. *Royal Society, Proceedings,* v. 228, ser. A, Feb. 22, 1955, p. 191-204.

Stresses and deformations in surfaces subjected to sliding friction. Diagrams, graphs. 16 ref. (Q9)

444-Q. Fatigue of Metals—Our Knowledge and the Deficiencies in Our Knowledge. P. L. Teed. *Shell Aviation News,* 1955, no. 199, Jan., p. 16-25.

Effects of surface treatment and heat treating on fatigue properties. Tables, graphs. 109 ref. (Q7)

445-Q. Heat Treating Tool Steels. V. Hot Work and High Speed Types. H. C. Manley and G. E. Brumbach. *Steel,* v. 136, Mar. 14, 1955, p. 106-109.

Effect of heat treating parameters on hardness. Photograph, diagrams, graphs. (Q29, J general, TS)

446-Q. The Effects of Chromium, Iron, and Nickel on the Mechanical Properties of Zirconium. W. Chubb and G. T. Muehlenkamp. *U. S. Atomic Energy Commission* BMI-938, Aug, 1954, 19 p.

Tensile properties, hot hardness, and impact strength of arc-melted, binary alloys of iodide zirconium containing up to 1-wt.% chromium, iron or nickel have been investigated. The alloys were tested in the alpha-annealed condition. Tables, graphs. 6 ref. (Q general, Zr)

447-Q. Study of Effects of Microstructure and Anisotropy on Fatigue of 24S-T4 Aluminum Alloy. H. A. Lipsitt, G. E. Dieter, G. T. Horne and R. F. Mehl. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3380, Mar. 1955, 42 p.

Experimental equipment, procedures and results. Tables, refractograms, micrographs, diagram, graphs. 16 ref. (Q7, Al)

448-Q. Brittle Fracture in Steel. II. An Introductory Summary. C. P. Oldridge. *Welding and Metal Fabrication,* v. 23, Mar. 1955, p. 103-111.

Testing procedures; notch properties; welding defects. Diagrams, graph, photographs. 122 ref. (Q23, K general, ST)

449-Q. (Dutch.) **A Comparison of the Accuracy of Indication of the Flow Limit in "Rigid" and "Soft" Tensile Equipment.** P. G. Rittershaus. *Metalen,* v. 10, no. 3, Feb. 15, 1955, p. 29-32.

Effects of testing machine characteristics on yield-point elongation measurements. Diagrams, graphs. (Q27, CN)

450-Q. (French.) **The Overheating of Steel.** Remy. *Centre de Documentation Siderurgique, Circulaire d'Informations Techniques,* v. 12, no. 2, 1955, p. 407-429.

Methods of detecting overheating, its causes and influence on mechanical properties. Photograph, micrographs, graphs. 42 ref. (Q general, ST)

451-Q. (French.) **Direct Determination of Brittleness Transition Temperature of Steels.** Georges Vidal and Anatole Popoff. *Comptes rendus,* v. 240, no. 5, Jan. 31, 1955, p. 487-489.

A new tensile test method permits more rational study of temper brittleness and fatigue. Diagram. 5 ref. (Q23, Q7, SS)

452-Q. (French.) **Interpretation of the Brittleness at 475° C. of Iron-Chromium Alloys.** Emile Josso. *Comptes rendus,* v. 240, no. 7, Feb. 14, 1955, p. 776-778.

Proposes a new interpretation of brittleness, based on the existence of an order-disorder transformation. Graphs. 6 ref. (Q23, Fe, Cr)

453-Q. (French.) **Use of Various Scientific Techniques in the Physical Study of the Plastic Deformation of Metals.** Raymond Jacquesson. *Revue générale des sciences pures et appliquées,* v. 61, nos. 11-12, Nov.-Dec. 1954, p. 324-341.

Torsion testing, chemical activity, strain hardening, and rolling are considered in study of deformation by torsion. Diagrams, graphs. (Q24)

454-Q. (German.) **The Problem of Brittle Fracture of Steel.** W. Felix and Th. Geiger. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 2, Feb. 1955, p. 33-49.

Mechanisms of brittle fracture;

experimental verification with a steel beam. Graphs, tables, refractograms, micrographs, photographs. 2 ref. (Q26, Q23, CN, AY)

455-Q. (German.) **Nonuniform Stress Distribution in the Case of Fatigue Stresses.** E. Siebel and M. Stieler. *VDI Zeitschrift,* v. 97, no. 5, Feb. 11, 1955, p. 121-126.

Evaluation of notch effect of ferrous and nonferrous metals under various loading conditions. Diagrams, tables, graphs. 14 ref. (Q7, Q25)

456-Q. (German.) **Three-Dimensional Photoelasticity in High-Pressure Apparatus Design.** C. Alt. *VDI Zeitschrift,* v. 97, no. 5, Feb. 11, 1955, p. 127-130.

Study of stress conditions in highly stressed pipes and vessels. Photographs, diagrams. 9 ref. (Q25)

457-Q. (German.) **Application of X-Ray Microstructure Methods.** Th. Geiger. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 2, Feb. 1955, p. 50-55.

X-ray study of the structural changes of two heat resistant steels during creep. Tables, photographs, X-ray recordings. 6 ref. (Q3, SS)

458-Q. (German.) **The Significance of an Electron Bombardment for the Plasticity of Metal Crystals.** Erich Schmid and Karl Lintner. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 71-76.

Review of the Seitz-Brinkman theory on the effect of corpuscular radiation on solid bodies; effect of radiation on the ductility of crystals; flow tests on Zn crystals under β radiation. Graphs. 23 ref. (Q23, Zn)

459-Q. (German.) **Damping and Modulus of Elasticity of Deformed and Recrystallized Copper.** Werner Köster, Lothar Bangert and Walter Lang. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 84-89.

Temperature dependence of damping and modulus of elasticity; effects of deformation and grain size; relaxation by means of grain boundary viscosity. Graphs. 20 ref. (Q8, Q21, Cu)

460-Q. (German.) **The Properties of Molten Metals. X. Internal Friction of Liquid Magnesium-Lead Alloys.** Erich Gebhardt, Manfred Becker and Erich Trägner. *Zeitschrift für Metallkunde,* v. 46, no. 2, Feb. 1955, p. 90-94.

Dependence of internal friction upon temperature and composition; activation energy for viscous flow. Tables, graphs. 15 ref. (Q22, Mg, Pb)

461-Q. (Polish.) **Influence of Structure on the Mechanical Properties of Structural Steels.** B. Baranowski. *Prace Instytutow Ministerstwa Hutnictwa,* 1954, no. 6, p. 277-294.

Three low-alloy steels, 30 HGSA, 35 SG and 36 HNM, show different microstructures after heat treatment and tension, fatigue and impact tests. Specimens with best strength properties possessed a microstructure of tempered martensite. Graphs, tables, photographs, micrographs. 18 ref. (Q general, M27, ST)

462-Q. Comparison of the Slow Notch-Bend Test and the V-Notch Charpy Impact Test for the Assessment of the Notch Ductility of C-Mn Steel. *British Welding Journal,* v. 2, Mar. 1955, p. 98-106.

Tests made on 1-in. thick plates. The two methods generally gave a similar rating to the samples. Tables, graphs. (Q5, Q6, AY)

463-Q. Creep of Zinc Crystals. E. P. T. Tyndall, R. A. Artman, C. A. Wert and Robert Eisner. *Journal of Applied Physics,* v. 26, Mar. 1955, p. 286-294.

Studies of plastic deformation in the region just beyond the elastic limit. Diagram, tables, graphs. 7 ref. (Q3, Zn)

464-Q. Some Effects of Variation in the Zinc Content on the Mechanical Properties and Corrosion Resistance of Al-Si-Cu Alloys. *Metallurgia,* v. 51, no. 305, Mar. 1955, p. 115-119.

Tests to ascertain extent to which zinc content of alloys might be raised without unduly adverse effects on properties. Diagrams, tables, graphs. (Q general, R general, Al)

465-Q. The Properties of a High-Manganese Austenitic Stainless Steel. G. N. Flint and L. H. Toft. *Metallurgia,* v. 51, no. 305, Mar. 1955, p. 125-129.

Although in some media the corrosion resisting properties of a stainless steel containing 18% Cr, 10% Mn, 2% Ni, stabilized with titanium, are equal to those of a titanium-stabilized 18-8 Cr-Ni steel, there are many industrial applications for which the high-manganese steel would not be suitable. The ductility and deep-drawing properties of the high-manganese steel are inferior to those of the 18-8-titanium type. Tables, photographs, micrographs. 3 ref. (Q23, G4, R general, SS)

466-Q. The Conjugate Load Method in Structural Analysis. W. L. Schwalbe. *Royal Aeronautical Soci-*

ety, Journal, v. 59, Mar. 1955, p. 199-208.

Stress analysis by applying a system of loads to a single member so that its behavior, as an isolated member, is identical to its behavior as an integral part of the structure. Graphs, tables, diagrams. 5 ref. (Q25)

467-Q. (English.) **The Formation and Growth of Kink Bands in Aluminium Crystals During Creep.** I. Igarashi and T. Ichiyama. *Technology Reports, Tohoku University,* v. 19, no. 1, 1954, p. 23-32.

Creep tests of aluminum of 99.99% purity. Diagrams, graph, photographs, micrographs. 8 ref. (Q3, Al)

468-Q. (Japanese.) **Fatigue Deformation of Springs.** Katsunobu Tomita and Takeshi Hirai. *Journal of Railway Engineering Research (Japan),* v. 12, no. 1, Jan. 10, 1955, p. 10-15.

Mechanism of fatigue; effects of rust formation on fatigue behavior. Tables, graphs, photographs. (Q7, R2, SG-b)

469-Q. (Japanese.) **Endurance of Leaf-Spring Steel as Affected by Various Heat Treatments.** Shigeo Owaku and Rikio Kurihara. *Journal of Railway Engineering Research (Japan),* v. 12, no. 1, Jan. 10, 1955, p. 16-17.

Effect of heat treatment methods and metal hardness on service life. Graphs, diagrams. (Q7, J general, SG-b)

470-Q. (Pamphlet.) **Delayed-Yield Time Effect in Mild Steel Under Oscillatory Axial Loads.** Naval Research Laboratory. PB 111410. 39 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.50.

Influence of loading rate on yield strength, especially at intermediate strain rates. Charts, diagrams, photographs. (Q27, CN)

471-Q. (Book.) **Fatigue of Metals and Structures.** H. J. Grover, S. A. Gordon and L. R. Jackson. 394 p. 1954. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $2.50.

Nature of fatigue failures; dependability of fatigue-test data; factors influencing fatigue behavior, and methods of detecting fatigue. (Q7)

472-Q. Elastic Constants of Aluminum From 20° C to 400° C. Charles Zucker. *Acoustical Society of America, Journal,* v. 27, Mar. 1955, p. 318-320.

Use of ultrasonic pulse technique as means of determining elastic constants of polycrystalline aluminum. Diagram, graphs. 10 ref. (Q21, Al)

473-Q. Plastic Strain and Stress Relations at High Temperatures. II. A. E. Johnson, N. E. Frost and J. Henderson. *Engineer,* v. 199, Mar. 25, 1955, p. 403-405.

Short-time combined stress properties of carbon steel and aluminum alloys. Graphs. 1 ref. (To be continued.) (Q27, Al, CN)

474-Q. A Hot Impact Tensile Test and Its Relation to Hot-Working Properties. E. A. Leech, P. Gregory and R. Eborall. *Institute of Metals, Journal,* v. 83, Mar. 1955, p. 347-353.

Simple, rapid laboratory test which can be used to assess the hot workability of materials. Diagrams, tables, graphs. 4 ref. (Q27, Q6)

475-Q. The Metallographic Detection of Deformation in Copper and Alpha-Brasses. L. E. Samuels. *Institute of Metals, Journal,* v. 83, Mar. 1955, p. 359-368 + 4 plates.

Survey of a wide range of etching techniques in detecting evidence of deformation. Tables, micrographs, graphs. 40 ref. (Q24, M21)

476-Q. How Chromium Steels Rate for High-Temperature Aircraft Service. II. E. A. Loria. *Iron Age,* v. 175, Apr. 14, 1955, p. 103-106.

Excellent properties allow them to be used to advantage in many applications. Graphs, tables. 4 ref. (Q general, T24, AY)

477-Q. How Stainless Steels Rate for High Temperature Aircraft Service. I. E. A. Loria. *Iron Age,* v. 175, Apr. 7, 1955, p. 119-122.

Comparison of mechanical properties of ferritic and austenitic grades. Tables, graphs. 3 ref. (To be continued.) (Q general, T24, SS)

478-Q. The Effect of Alpha-Particle Bombardment on the Creep of Cadmium Single Crystals. M. J. Makin. *Journal of Nuclear Energy,* v. 1, Feb. 1955, p. 181-193.

No significant change in creep rate was detected, although experiments were made on crystals differing in purity, surface condition and orientation. Tables, diagram, graphs. 17 ref. (Q3, Cd)

479-Q. Better Steel Castings for High-Temperature Plant. W. Siegfried and F. Eisermann. *Metal Progress,* v. 67, Apr. 1955, p. 100-101.

Effects of minor amounts of vanadium, nickel and copper on stress-rupture of smooth and notched specimens. Graphs, table. (Q4, Ni, Cu, V, CN)

480-Q. The Geometrical Size Effect in Notch Brittle Fracture. A. A.

Wells. *North East Coast Institution of Engineers & Shipbuilders, Transactions,* v. 71, Apr. 1955, p. 277-290.

Discussed in the light of metallurgical and geometrical variables. Tables, graphs. 17 ref. (Q26)

481-Q. The Plastic Indentation of a Layer by a Flat Punch. R. T. Shield. *Quarterly of Applied Mathematics,* v. 13, Apr. 1955, p. 27-46.

Upper and lower bounds for average pressure in the indentation obtained by application of the limit-design theorems. Diagrams, graphs. 7 ref. (Q23)

482-Q. The Effect of Microstructure on the Morphology of Fracture. I. J. C. Danko and R. D. Stout. *Welding Journal,* v. 34, Mar. 1955, p. 113S-116S.

Investigates effect of pearlitic microstructures in the morphology of fracture and a theoretical explanation on the deformation behavior of pearlite. Table, graph, micrographs. 11 ref. (Q26, M27, ST)

483-Q. The Effect of Microstructure on Notch Toughness. II. John H. Gross and Robert D. Stout. *Welding Journal,* v. 34, Mar. 1955, p. 117S-122S.

Variables affecting notch toughness of unhardened plain carbon steels. Tables, diagram, graphs, micrographs. 5 ref. (Q23, M27, CN)

484-Q. Temper Brittleness of Pressure Vessel Steels. Leonard D. Jaffe. *Welding Journal,* v. 34, Mar. 1955, p. 141S-150S; disc., p. 151S-152S.

Nature of the phenomenon, its manifestation and how it may be prevented. Graphs, photographs, micrographs, tables. 177 ref. (Q23, CN, AY)

485-Q. Fatigue of Spot Welds. Georges Welter. *Welding Journal,* v. 34, Mar. 1955, p. 153S-156S.

Review of reports relating to fatigue resistance of untreated and hydrostatically treated spot welds and its chronological development during the last 10 years. 10 ref. (Q7, K3)

486-Q. Energy Criteria of Fracture. E. Orowan. *Welding Journal,* v. 34, Mar. 1955, p. 157S-160S.

Modifications of Griffith theory presented to cover the case for a rapidly running crack and for starting up a stationary crack. Diagrams. 8 ref. (Q26)

487-Q. Residual Stresses Set Up by Flame Hardening. H. Bühler. *Henry Brutcher Translation No.* 3465, 10 p. (Abridged from *Archiv für das Eisenhüttenwesen,* v. 25, nos. 3-4, 1954, p. 153-158.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 508-Q, 1954. (Q25, J1, J2, ST)

488-Q. (English.) **A New Method for the Statistical Treatment of Fatigue Data.** Waloddi Weibull. *SAAB Aircraft Company, Technical Notes, SAAB TN* 30, 1954, 19 p.

New life scale for representation of S-N curves for estimating scatter of fatigue strength as a function of fatigue life. Tables, graphs. 7 ref. (Q7)

489-Q. (English.) **The Static Strength and the Fatigue Strength of Riveted, Spotwelded, and Redux-Bonded Joints in 24S-T Aluminum Alloy Sheet.** Waloddi Weibull. *SAAB Aircraft Company, Technical Notes, SAAB TN* 31, 1954, 12 p.

Ultimate tensile strengths and fatigue lifetimes of five different joints determined and compared with corresponding values of plain specimens taken from the same sheet. Tables, diagrams, graphs. (Q23, Q7, Al)

490-Q. (English.) **The Propagation of Fatigue Cracks in Light-Alloy Plates.** Waloddi Weibull. *SAAB Aircraft Company, Technical Notes, SAAB TN* 25, 1954, 20 p.

Observations on aluminum and magnesium alloys. Tables, diagrams, graphs. (Q7, Al, Mg)

491-Q. (German.) **Effect of High-Temperature Annealing of Ingots on Structure Formation and Properties of Aluminum-Manganese Alloys (Aluman).** H. Hug. *Metall,* v. 9, nos. 5-6, Mar. 1955, p. 176-180.

Effect of heat treating temperature and time on the rolling properties of continuously cast ingots and on the mechanical properties of the rolled sheets. Graphs, table, micrographs. (Q general, J23, F23, Al)

492-Q. (German.) **Steep Decline of the Curve of Notched Bar Toughness and Appearance of Fracture of the Notched Bars With Heavy Plates Made of Soft Steels.** Heinz Kornfeld. *Stahl und Eisen,* v. 75, no. 5, Mar. 10, 1955, p. 265-278.

Relations between impact energy absorbed and occurrence of brittle fractures. Graphs, tables, photographs. 7 ref. (Q26, Q6, CN)

493-Q. (Polish.) **Statistical Relation of Q_r to R_r in Heat Treated Steel TR2.** Zygmunt Jasiewicz. *Hutnik,* v. 21, no. 8, Aug. 1954, p. 249-255.

Frequency-distribution curves of strength determinations on speci-

mens of a low alloy steel. Graphs, tables. (Q23, AY)

494-Q. (Russian.) **Investigation of Wear Resistance of Sulfided Cutters Made of High-Speed Steel.** E. P. Nadeinskaia. *Stanki i Instrument,* v. 26, no. 2, Feb. 1955, p. 11-17.

Comparisons made of wear on cutters with those normally heat treated, in relation to speed and time of cutting. Tables, graphs. (Q9, L15, TS)

495-Q. Beams of Metal or Wood Subjected to Millions of Reversals of Compression and Tension (Sigma$_c$ = —Sigma$_t$) or to Longtime Steady Compression Longitudinally. Arthur Buchwald Lamberg. *Franklin Institute, Journal,* v. 259, Apr. 1955, p. 335-344.

Formulas produce dynamic endurance limits which may be used also as static endurance limits. (Q25, Q7)

496-Q. The Stresses in an Aeolotropic Circular Disk. H. F. Cleaves. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 8, Mar. 1955, p. 59-80.

Comprehensive treatment of the generalized plane stress problem under the most general edge loading. Tables, graphs. 7 ref. (Q25)

497-Q. Impact Buckling of Deep Beams in Pure Bending. J. F. Davidson. *Quarterly Journal of Mechanics and Applied Mathematics,* v. 8, Mar. 1955, p. 81-87.

Behavior of a slender beam, having slight initial curvature and twist, and bent by impulsive moments of a type tending to produce lateral instability. Graphs, diagram, table. 5 ref. (Q5)

498-Q. Finite Deformation of Materials Exhibiting Curvilinear Aeolotropy. J. E. Adkins. *Royal Society, Proceedings,* v. 229, ser. A, Apr. 5, 1955, p. 119-134.

Theory is formulated for materials which are completely unsymmetrical, orthotropic or transversely isotropic with respect to the curvilinear co-ordinate system which is employed to define the aeolotropy. 10 ref. (Q21, Q24)

499-Q. A Resistance-Wire Grid System. Desi D. Vasarhelyi. *Trend in Engineering, (University of Washington),* v. 7, Apr. 1955, p. 4-9, 14.

A valuable method in solving the problem of mapping deformations without any interruption of the main testing process. Photographs, diagram. 4 ref. (Q25, Q24)

500-Q. (French.) **Enlargement of Rays of Debye-Scherrer Diagrams During the Plastic Deformation of Metallic Crystals.** Aurel Berghezan and Jean Hérenguel. *Comptes rendus,* v. 240, no. 12, Mar. 21, 1955, p. 1343-1345.

Describes study on five, regular 99.5% pure aluminum flakes, subjected to gradual oxidation. Diagrams. 2 ref. (Q24, Al)

501-Q. (French.) **Magnetic Measurements in Tensile Tests.** P. E. Lagasse. *Revue de métallurgie,* v. 52, no. 1, Jan. 1955, p. 28-32; disc., p. 32.

Method used to study structure changes in metals due to cold working and strain aging. Diagram, graphs, photograph. (Q27, P16)

502-Q. (French.) **The Use of Steels Subjected to Triaxial Stresses at High Temperature.** W. Siegfried. *Revue de métallurgie,* v. 52, no. 3, Mar. 1955, p. 201-218.

Study of creep resistance of various shapes of gears and turbine blades. Graphs, photographs, diagrams, tables. 4 ref. (Q3, AY)

503-Q. (French.) **Correlation Between the Structure and the Mechanical Properties of Gray Cast Irons.** Albert de Sy. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 3, Mar. 1955, p. 76-80.

Study of tensile strength as a criterion of quality and the influence of shape, dimensions, quantity and distribution of graphite. Diagrams, micrographs. (Q23, M27, CI)

504-Q. (German.) **Formation of Preferred Magnetic Orientations by Inhomogeneous Stresses on Magnetostriction Materials.** Eduard Houdremont and Otto Rüdiger. *Archiv für das Eisenhüttenwesen,* v. 26, no. 3, Mar. 1955, p. 153-157.

Effect of inhomogeneous stresses due to cold rolling, surface working, bending and embossing of grooves; detection of preferred orientation by magnetite-powder configurations. Diagrams, graphs, tables, micrographs. 18 ref. (Q24)

505-Q. (Italian.) **Properties of High Tin Content Aluminum-Tin-Copper Friction Alloys.** N. Collari and L. Paglialunga. *Alluminio,* v. 24, no. 1, Jan. 1955, p. 29-33.

Heat and mechanical treatments required to realize the best integration of the alloying element. Graphs, tables, micrographs. 7 ref. (Q9, Sn, Cu, Al)

506-Q. (Italian.) **Creep Tests With Variations of Load at Constant Temperature.** A. Erra. *Metallurgia italiana,* v. 47, no. 2, Feb. 1955, p. 53-60, 61-62.

Series of creep tests on a chromium-molybdenum steel having a high creep limit, conducted at 500° C., with various types of load variations after 160 hr. Graphs, tables. 15 ref. (Q3, Cr, Mo)

507-Q. (Japanese.) **Weldable High Tensile Strength Steels.** Fukuji Ogino. *Metals (Japanese),* v. 25, no. 2, Feb. 1955, p. 85-87.

Studies of notch impact and other strength characteristics, at various temperatures, etc. Graphs, micrographs, tables. (Q23, Q6, AY)

508-Q. (Russian.) **Effect of the Melting Methods on the Properties of High Speed Steel.** Kim Den Son and A. M. Samarin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 11, Nov., p. 27-35.

Use of concentrates of tungstate ores; effect of tungstite on manganese content. Increased manganese content and heat treatment required. Tables, graphs. 3 ref. (Q general, TS)

509-Q. (Russian.) **Plastic Deformation of Steel Under Complex Stressing.** A. M. Zhukov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 11, Nov., p. 53-61.

Polyaxial stress-strain relations; divergence of experimental and theoretical results. Tables, graphs, photograph. 5 ref. (Q24, ST)

510-Q. (Russian.) **Residual Stresses in Surface Layers of Metals, and Wear Resistance.** P. E. D'iachenko and T. V. Smushkova. *Vestnik Mashinostroeniia,* v. 35, no. 3, Mar. 1955, p. 38-40.

Influence of residual stress, caused by cold working or machining, on the wear resistance of different steels and cast irons. Graphs. 1 ref. (Q9, Q25, ST, CI)

511-Q. (Russian.) **Effect of Surface-Active Substances on Mechanical Properties of Electrolytic Deposits of Copper.** Iu. S. Tsareva, V. G. Solokhina, N. T. Kudriavtsev and A. T. Vagramian. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 1, Jan. 1955, p. 166-173.

Comparison of results with organic additions and with pure electrolytes. Graphs, diagram, table. 9 ref. (Q general, L17, Cu)

512-Q. (Russian.) **Analysis of the Stressed State in Large Plastic Deformations During the Stretching of Cylindrical Test Pieces With Annular Grooves.** A. N. Grubin and Iu. I. Likhachev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 3, Mar. 1955, p. 512-528.

Physical relations between stresses and strains; boundary and contour conditions; data for stress and strain components in plastic range. Diagrams, graphs. 7 ref. (Q24)

513-Q. (Swedish.) **The Nominal Cleavage Strength of Steel.** Tore Norén. *Jernkontorets Annaler,* v. 139, no. 3, 1955, p. 141-153.

Determination by exposing test pieces with weld-deposited brittle surface layers to increasing tensile strength. Diagram, photographs, graphs, table. (Q26, L24, ST)

514-Q. (Swedish.) **The Fracture Mechanism of Steels Intended for Welding.** Cyrill Schaub. *Jernkontorets Annaler,* v. 139, no. 3, 1955, p. 154-173.

Criterion of brittleness transition range of steel. Tables, graphs, diagrams, photographs, micrographs. 12 ref. (Q23, Q26, K general, ST)

515-Q. (Swedish.) **The Creep of Metals.** Erik Nygren. *Jernkontorets Annaler,* v. 139, no. 3, 1955, p. 182-204.

Literature survey regarding the creep of metals. Graphs. 31 ref. (Q3)

516-Q. **A Large-Deflection Theory for Thin Plates.** E. H. Mansfield and P. W. Kleeman. *Aircraft Engineering,* v. 27, Apr. 1955, p. 102-108.

Theory based on assumption of an inextensional middle surface of the plate. Diagrams, graphs, photograph. 6 ref. (Q23)

517-Q. **Energy Theorems and Structural Analysis. I. General Theory.** J. H. Argyris. *Aircraft Engineering,* v. 27, Apr. 1955, p. 125-128, 129-134.

Application on energy principles of structural analysis including effects of temperature and nonlinear stress-strain relations. Diagrams, tables. 7 ref. (To be continued) (Q25)

518-Q. **The Selection and Treatment of High Speed Steels.** W. Sorby. *Alloy Metals Review,* v. 8, Mar. 1955, 9 p.

Tungsten, chromium, molybdenum, vanadium and cobalt, in various combinations, are used to develop abrasion resistance and high hardness characteristics at elevated temperatures. Tables, graphs, micrograph, diagram. (Q29, Q9, J general, TS)

519-Q. **The Determination of Residual Stresses in Hardened, Ground Steel.** L. V. Colwell, M. J. Sinnott and J. C. Tobin. *American Society of Mechanical Engineers, Paper No.* 54—A-52. 1955, 12 p.

Residual surface stresses, induced by grinding a hardened SAE 4340 steel, investigated by means of X-ray diffraction and optical inter-

ferometric methods. Tables, graphs, diagram. 8 ref. (Q25, G17, AY)

520-Q. Frictional Characteristics and Surface Damage of Thirty-Nine Different Elemental Metals in Sliding Contact With Iron. Carl L. Goodzeit, Arvid E. Roach, and Richard P. Hunnicutt. *American Society of Mechanical Engineers, Paper* No. 54—A-53, 1955, 10 p.

Surface-damage characteristics related to the relative hardness of the metals in sliding contact, their mutual solubility and their ability to form intermetallic compounds. Tables, diagram, photographs, micrographs. 11 ref. (Q9, Fe)

521-Q. Residual Grinding Stresses in Hardened Steel. H. R. Letner. *American Society of Mechanical Engineers, Paper* No. 54—A-56, 1955, 12 p.

Residual stresses resulting from surface grinding a hardened ball-bearing-type steel, under closely controlled conditions, measured by deflection method. Effects of wheel grade, unit downfeed and grinding fluid upon the stresses generated. Graphs, photographs, table, diagram. 6 ref. (Q25, G17, AY)

522-Q. Scoring Characteristics of Thirty-Eight Different Elemental Metals on High-Speed Sliding Contact With Steel. A. E. Roach, C. L. Goodzeit and R. P. Hunnicutt. *American Society of Mechanical Engineers, Paper No.* 54—A-61, 1955, 14 p.

Metals that have the best score resistance against steel are the B-subgroup metals which are either insoluble with iron or else form intermetallic compounds with iron. Tables, graphs, photographs, diagram. 18 ref. (Q9, ST)

523-Q. Effect of Sequence on the Coefficient of Friction in Cold-Drawing Low-Carbon Steel and 2S-O Aluminum Rods. III. H. Majors, Jr. *American Society of Mechanical Engineers, Paper No.* 54—A-114, 1955, 13 p.

Average coefficients of drawing friction determined by Sachs theory and direct measurement, using SR-4 wire strain gages on the outer surface of the die. Die profiles determined by plastic castings. Tables, diagrams, graphs, photograph. 18 ref. (Q9, Q25, Al, CN)

524-Q. Stresses and Strains in Cold-Extruding 2S-O Aluminum. Erich G. Thomsen and Joseph Frisch. *American Society of Mechanical Engineers, Paper No.* 54—A-161, 1955, 20 p.

Steady-state particle-velocity vectors determined from gridded, split billets during incremental extrusion steps. Photographs, diagrams, graphs. 8 ref. (Q25, F25, Al)

525-Q. A Method of Predicting the Effects of Notches in Uniaxial Fatigue. William E. Dirkes. *American Society of Mechanical Engineers, Paper No.* 54—A-180, 1955, 9 p.

Correlates notches and unnotched test data by semigraphical method of extrapolating notched test results. Graphs. 9 ref. (Q7)

526-Q. Biaxial Plastic Stress-Strain Relations of a Mild Steel for Variable Stress Ratios. Joseph Marin and Ling-Wen Hu. *American Society of Mechanical Engineers, Paper No.* 54—A-243, 1955, 11 p.

Experimental checks on validity of simple flow theory of plasticity did not support the theory. Graphs. 5 ref. (Q23, CN)

527-Q. Design Aspects of High Temperature Fatigue With Particular Reference to Thermal Stresses. L. F. Coffin, Jr. *American Society of Mechanical Engineers, Paper No.* 54—A-252, 1955, 19 p.

Design criterion based on experiments carried out on test specimens subjected both to constrained thermal cycling and constant temperature strain cycling. Tables, graphs. 20 ref. (Q7, Q25)

528-Q. Approximate Solution to Thermal Shock Problems in Plates, Hollow Spheres and Cylinders With Heat Transfer at Two Surfaces. A. Mendelson and S. S. Manson. *American Society of Mechanical Engineers, Paper No.* 54—A-264, 1955, 29 p.

Mathematical analysis. Graphs. 7 ref. (Q general)

529-Q. Errors in Deformation Measurements for Elevated-Temperature Tension Tests. John M. Thomas and John F. Carlson. *ASTM Bulletin,* 1955, no. 206, May, p. 47-51.

Tests illustrate magnitude of errors possible and also additional accuracy of one method of calculating the "effective" gage length for a test specimen with extensometer attachments beyond the reduced section. Photographs, tables, graphs. (Q27)

530-Q. Plastic Strain and Stress Relations at High Temperatures. III. A. E. Johnson, N. E. Frost and J. Henderson. *Engineer,* v. 199, Apr. 1, 1955, p. 457-458.

Tests to determine plastic strain-stress relations of steel and an aluminum alloy. Table. (Q23, ST, Al)

531-Q. 10-Ton Fatigue Testing Machine. H. L. Cox and N. B. Owen.

Engineering, v. 179, Apr. 22, 1955, p. 500-504.
Mechanical fatigue testing machine of ten tons load range which operates at the resonant frequency of a mass-spring system, at about 2,000 c.p.m. Diagrams, photographs, tables, graphs. (Q7)

532-Q. Intercrystalline Fracture of Beta-Brasses Containing Aluminium. E. C. W. Perryman. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 369-377.
Mechanism that causes intergranular failures occurring in binary and ternary beta brasses. Tables, diagram, graphs. 21 ref. (Q26, Cu)

533-Q. The Effect of Zirconium and Titanium on the Intercrystalline-Cracking Tendency of Beta-Brasses. E. C. W. Perryman and R. J. Goodwin. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 378-382.
Impact-tensile tests and tests under sustained tensile stress in 3% sodium chloride solution carried out to evaluate effect of these additions on the tendency to intercrystalline flow and fracture. Tables, graph. 4 ref. (Q26, Cu)

534-Q. The Slip-Band Extrusion Effect Observed in Some Aluminium Alloys Subjected to Cyclic Stresses. P. J. E. Forsyth and C. A. Stubbington. *Institute of Metals, Journal,* v. 83, Apr. 1955, 395-399.
Nature and occurrence of surface debris exhibited along parallel cracks of the crystals. Diagrams. 6 ref. (Q24, Al)

535-Q. Creep of Aluminum Under Cyclotron Irradiation. M. R. Jeppson, R. L. Mather, A. Andrew and H. P. Yockey. *Journal of Applied Physics,* v. 26, Apr. 1955, p. 365-367.
Measuring the effect of cyclotron irradiation on the steady-state creep rate of aluminum. Diagram, graph, table. 8 ref. (Q3, Al)

536-Q. Magnetic Measurement of the Hardness of Metals. D. Hadfield. *Metal Treatment and Drop Forging* v. 22, Apr. 1955, p. 153-159.
Development during past 20 years of various types of instruments designed to measure or compare, magnetically, the hardness value of metals. Photographs, table. (To be continued.) (Q29)

537-Q. A General Creep and Recovery Property of Metals. A. J. Kennedy. *Nature,* v. 175, Apr. 16, 1955, p. 674-676.
Mathematics of difference between continuous and discontinuous creep. Graph. 4 ref. (Q3)

538-Q. New Design Concepts for Machine Members Subjected to Fatigue. W. L. Starkey. *News in Engineering at Ohio State University,* v. 27, Apr. 1955, p. 13-16.
Four concepts which may be used as bases for design of machine members subjected to cyclic stresses. Graphs, photographs. (Q7)

539-Q. The Mechanism of Rolling Friction. I. The Plastic Range. II. The Elastic Range. K. R. Eldredge and D. Tabor. *Royal Society, Proceedings,* v. 229, ser. A, Apr. 21, 1955, p. 181-220 + 4 plates.
Study of friction and surface damage produced when a hard steel sphere rolls between flat parallel surfaces of a softer metal, and the mechanism of rolling friction under conditions where the deformations involved are predominantly elastic. Graphs, diagrams, tables, photographs. 34 ref. (Q9)

540-Q. Influence of Solid Particles in Oil on Babbitt, Copper-Lead and Aluminium Bearings. *Scientific Lubrication,* v. 7, Apr. 1955, p. 31-34.
Test procedure and results. Tables, graphs. 7 ref. (Q9, SG-c)

541-Q. More Muscles in Steel. Allen G. Gray. *Steel,* v. 136, Apr. 25, 1955, p. 96-99.
Steel, with tensile properties of 260,000 to 280,000 psi. has strength-weight ratio above the strongest aluminum and commercial titanium alloys. Table, photographs.
(Q general, ST, Al, Ti)

542-Q. The Prevention of Stretcher Strains. Henri P. Tardif. *Steel Processing,* v. 41, Apr. 1955, p. 241-244, 260, 263.
Machines used for the removal of the yield point of the steel and the consequent prevention of stretcher strain markings upon drawing in a press. Photographs, graphs, table. 30 ref. (Q23, G4, ST)

543-Q. An Investigation of the Hot Ductility of High Temperature Alloys. E. F. Nippes, W. F. Savage, B. J. Bastian, H. F. Mason and R. M. Curran. *Welding Journal,* v. 34, Apr. 1955, p. 183S-196S.
Details of construction of a device for determining effects of testing temperature and prior thermal history on hot ductility of structural alloys. Diagrams, tables, photographs, graphs, micrographs. 10 ref. (Q23, SG-h)

544-Q. On the Process of Fracture of Plastic Metals. Ya. B. Fridman and T. K. Zilova. *Henry Brutcher Translation No.* 2876, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 73, no. 4, 1950, p. 697-700.) Henry Brutcher, Altadena, Calif.

Principal advantage of macromethod; possibility of studying the progress of fracture from the start to the end. Graphs. micrographs, diagram. 6 ref. (Q26)

545-Q. Residual Stresses in Continuously Cast Aluminum Bars. G. Seeger. *Henry Brutcher Translation No.* 2916, 11 p. (From *Giesserei,* v. 38, no. 14, 1951, p. 325-329.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 526-Q, 1951.
(Q25, C5, Al)

546-Q. Wear Caused by Metal-Against-Metal Sliding Friction, With Special Consideration of the Effect of Temperature. I-II. W. Rädeker. *Henry Brutcher Translation Nos.* 3460-3461, 42 p. (Slightly abridged from *Archiv für das Eisenhüttenwessen,* v. 15, no. 10, 1942, p. 453-469.) Henry Brutcher, Altadena, Calif.

Study of wear processes at temperatures ranging from −310 to 1300° F. Graphs, photographs, micrographs. 32 ref. (Q9)

547-Q. (English.) **Dislocation Theory of the Fatigue Fracture of Ductile Metals.** Francisco Eiichi Fujita. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 6, Dec. 1954, p. 565-572.

A proposed dislocation theory to explain fatigue crack or small void, growth of void, generation and propagation of a fatigue crack, etc. Diagrams, graphs. 17 ref. (Q7)

548-Q. (German.) **Changing Modulus of Shear of Tin During Transition From the State of Normal Conductivity to the State of Superconductivity.** P. Grassmann and J. L. Olsen. *Helvetica Physica Acta,* v. 28, no. 1, 1955, p. 24-32.

Theoretical analysis, methods of investigation, equipment used. Table, diagram, drawings. 23 ref.
(Q2, Sn)

549-Q. (German.) **Hard Metals of Titanium Carbide for High Temperature Use.** K. Pfaffinger. *Planseeberichte für Pulvermetallurgie,* v. 3, no. 1, Feb. 1955, p. 17-33.

Mechanical properties of WZ alloys, with nickel-cobalt-chromium bonding elements, at temperatures up to 1000° C. Tables, graphs, photographs. 16 ref. (Q general)

550-Q. (German.) **Experiments to Unify the Scleroscope Hardness Test.** Hans Schmitz and Wilhelm Schlüter. *Stahl und Eisen,* v. 75, no. 7, Apr. 7, 1955, p. 411-416.

Determination of the scatter range of the individual results of measurement and average results from the five single measurements. Graphs, diagram, table. 2 ref. (Q29)

551-Q. (Hungarian.) **Enrichment of Copper on the Surface of Rolled Steels.** Rezsö Hantos and Ferenc Boda. *Kohazati Lapok,* v. 10, no. 3, Mar. 1955, p. 123-124.

Determination of low-copper steels for investigation of the causes of surface cracking. Suggestions for avoiding the phenomenon. Tables, photograph, graphs.
(Q26, F23, AY)

552-Q. (Hungarian.) **Correlation Between the Specific Impact Values Measured in Charpy or Mesnager Specimens.** Nandor Hajto. *Kohaszati Lapok,* v. 10, no. 3, Mar. 1955, p. 136-137.

Comparison made on basis of large number of tests; results and interpretation. Graph. (Q6)

553-Q. (Russian.) **Temperature-Time Dependency of the Strength of Pure Metals.** S. N. Zhurkov and T. P. Sanfirova. *Doklady Akademii Nauk SSSR,* v. 101, no. 2, Mar. 11, 1955, p. 237-240.

Relation of life and activation energy to stress. Graphs, table. 19 ref. (Q7, Q23, Zn, Al, Ag, Pt)

554-Q. (Book.) **Analysis of Statically Indeterminate Structures.** John I. Parcel and Robert B. B. Moorman. 571 p. 1955. John Wiley & Sons, 440 Fourth Ave., New York 16, N. Y. $9.50.

Basic theory and practical authoritative coverage of the problems facing structural engineers. (Q25)

555-Q. (Book.) **Design Manual for High-Strength Steels.** H. Malcolm Priest and John A. Gilligan. 174 p. 1954. United States Steel Corp., 525 William Penn Place, Pittsburgh 30, Pa.

Engineering data on mechanical properties and corrosion resistance. Allowable unit stresses. Designing against corrosion.
(Q general, R general, AY)

556-Q. Contribution to the Knowledge of Pressure Measurements During Metal Deformation. J. Frisch. *ASME, Transactions,* v. 77, May 1955, p. 509-512; disc., p. 512-513.

Mean pressure and radial wall stresses measured during the extrusion of commercially pure lead. Diagram, graphs. 6 ref. (Q24, F24, Pb)

557-Q. Fatigue Tests on Rolled Alloy Steels Made in Electric and Open-Hearth Furnaces. P. H. Frith. *Iron and Steel Institute, Journal,* v. 180, May 1955, p. 26-33 + 3 plates.

Longitudinal and transverse re-

versed bending fatigue properties obtained for basic electric-arc and acid openhearth steels. Tables, micrographs. (Q7, AY)

558-Q. High Temperature Properties of Iron-Rich Fe-Mo Alloys. S. F. Reiter and W. R. Hibbard, Jr. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 655-663.

Constant strain rate tensile tests were performed between room temperature and 1800° F. Data analyzed to determine effect of temperature and composition on the strain hardening coefficient and strain rate sensitivity. Tables, graphs, micrographs. 30 ref. (Q27, Fe, Mo)

559-Q. Effect of the Structure of Dislocation Boundaries on Yield Strength. Jack Washburn. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 675-681.

Effect of dislocation boundaries on flow stress under the following experimental conditions; substantially pure shear deformation, and boundaries of controlled angle, orientation and number. Diagrams, photographs, graphs, micrographs. 15 ref. (Q23, Zn)

560-Q. Creep Deformation of Magnesium at Elevated Temperatures by Nonbasal Slip. A. R. Chaudhuri, H. C. Chang and N. J. Grant. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, May 1955, p. 682-688.

Tests were run at 500 and 700° F. at stresses of 148 to 786 psi. Based on these measurements and theoretical calculations, the crystallographic elements for nonbasal slip were determined. Micrographs, diagrams, tables. 12 ref. (Q3, Mg)

561-Q. Fatigue and the Comet Disasters. Tom Bishop. *Metal Progress,* v. 67, May 1955, p. 79-85.

Engineering and metallurgical tests carried out to determine cause of the accidents. Photographs, graph, diagram. (Q7)

562-Q. Lubricants for Titanium. Ernest Rabinowicz and E. P. Kingsbury. *Metal Progress,* v. 67, May 1955, p. 112-114.

Certain long-chain hydrocarbons with active atomic groupings attached along the chain are best so far discovered; they reduce the coefficient of friction by two thirds, and wear by a factor of ten or more. Graph, diagram. (Q9, Ti)

563-Q. Hydrogen Embrittlement of Titanium Alloys. Harris M. Burte, Eugene F. Erbin, George T. Hahn, Ralph J. Kotfila, John W. Seeger and Donald A. Wruck. *Metal Progress,* v. 67, May 1955, p. 115-120.

Embrittlement observed in the laboratory at levels as low as 150 p.p.m. Tables, graphs. (Q23, Ti)

564-Q. Exact Reduction and Solution by Parts of Equations for Elastic Structures. Börje Langefors. *SAAB Aircraft Company, Technical Notes, SAAB TN* 24, 1953, 9 p.

Matrix equations for elastic structures and similar physical systems are established by using elastic and topological properties. 9 ref. (Q21, Q25)

565-Q. A Suggested Method for Calculating the Stresses in Wings With Nonrectangular Plates. Börje Langefors. *SAAB Aircraft Company, Technical Notes, SAAB TN* 23, 1953, 11 p.

Analysis of oblique plates by the aid of superposition of elementary solutions. Diagrams. 5 ref. (Q25)

566-Q. On Traveling Waves in Beams. Robert W. Leonard and Bernard Budiansky. *U. S. National Advisory Committee for Aeronautics; Report* 1173, 1954, 27 p.

Numerical traveling-wave solutions are obtained for some elementary problems of finite uniform beams for which the propagation velocities of bending and shear discontinuities are taken to be equal. Table, graphs. 18 ref. (Q2, Q5)

567-Q. (English.) **New Methods for Computing Parameters of Complete or Truncated Distribution.** Waloddi Weibull. *Aeronautical Research Institute of Sweden, Report* 58, 1955, 21 p.

Methods applicable to truncated or censored distributions which may be required when dealing with distributions composed of more than one component or with fatigue tests stopped at some predetermined time before all the specimens have failed. Tables, graphs. 3 ref. (Q7)

568-Q. (German.) **Indication of the Brittleness of Steel by Determining Its Yield Point, Tensile Strength, and Resistance to Necking in Triaxially Stressed Test Specimens.** Albert Kochendörfer and Christof Rohrbach. *Archiv für das Eisenhüttenwesen,* v. 26, no. 4, Apr. 1955, p. 213-229.

Method and material used. Composition of steels and heat treatment. Shape of test specimens. Tables, diagrams, photographs. 28 ref. (Q23, Q27, ST)

569-Q. (German.) **Structure, Mechanical Behavior, and Standardization of Gray Cast Iron in the Light of a Bivariant System.** A. Collaud. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 4, Apr. 1955, p. 105-117.

Relation between structure and mechanical properties. Tables, diagrams.
(Q general, M general, CI)

570-Q. (Russian.) **Poisson's Ratio in the Plastic Range.** A. M. Zhukov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 12, Dec., p. 86-91.

Correlation of work of various experimenters on determination of Poisson's ratio of aluminum and steel at 350 and 750° C. Graphs, table. 12 ref. (Q21, Al, ST)

571-Q. (Russian.) **Peculiarities of the Deformation of Monocrystalline and Polycrystalline Copper During High-Temperature Heating in a Vacuum.** M. G. Lozinskii and S. G. Fedotov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 12, Dec., p. 92-96.

Effect of grain size on strength; "viscous" behavior of grain boundaries; effect of temperature on crystal orientation and hardness. Micrographs, graphs, diagram. 8 ref. (Q24, M26, Cu)

572-Q. (Russian.) **Investigation of the Mechanical Properties of White Cast Iron and the Stresses in It.** L. I. Kozhinskii. *Liteinoe Proizvodstvo,* 1955, no. 4, Apr., p. 19-22.

Modulus of elasticity and bending strength determinations. Effects of carbon content and other constituents. Diagrams, graphs, tables, micrographs. 4 ref. (Q21, Q5, CI)

573-Q. (Russian.) **Thermoplastic After Effect in Metals.** I. N. N. Davidenkov and D. M. Vasil'ev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 671-679.

Dilatometric measurements on steels during heating. Relation of magnitude of after effect to carbon content, impurities and previous heat treatment. Graphs, tables, diagram. 4 ref. (Q7, ST)

574-Q. (Russian.) **Relation of Rate and Relaxation Coefficients of Aluminum to the Rate of Plastic Deformation.** L. I. Vasil'ev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 4, Apr. 1955, p. 687-690.

Experimental data. Explanation of regularities observed. Graphs. 4 ref. (Q24, Al)

575-Q. Testing Fatigue Life of Skin Panels. Edward Schiff. *Aero Digest,* v. 70, May 1955, p. 42, 44, 46.

Simple water pressure system yields rapid cyclicization of specimen and provides automatic cutoff at failure. Diagram, photographs. (Q7)

576-Q. Application of Photoelasticity to the Design of Tensile Specimens for Ceramic-Metal Materials. M. B. Stiefel. *American Ceramic Society Bulletin,* v. 34, May 1955, p. 133-137.

Evaluates tests for cermets by comparing the stress distributions obtained from different types of designs of tensile specimens. Photographs, diagrams. 12 ref. (Q27)

577-Q. Tensile and Fatigue Tests on Hardened and Tempered Nodular Irons. G. N. J. Gilbert and K. B. Palmer. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, Apr. 1955, p. 604-605 + 5 plates.

Tensile results on bars tempered between 400 and 600° C. for times up to 4 hr., and unnotched and notched fatigue results on specimens tempered for 2 hr. at 550 and 600° C. Tables, micrographs, graphs, diagrams. 11 ref. (Q27, Q7, CI)

578-Q. The Relation Between Brittle Behavior and the Strength and Structure of Materials. F. J. Hiorns. *British Coal Utilisation Research Association, Monthly Bulletin,* v. 19, Feb. 1955, p. 49-60.

Factors affecting breakage of solids, particularly those in a brittle state. Graph, table. 104 ref. (Q23)

579-Q. The Cracking of Layers of Brittle Material by Differential Strains. D. J. Millard. *British Journal of Applied Physics,* v. 6, Apr. 1955, p. 124-127.

Crack patterns due to shrinkage in three dimensions; experimental study of crack patterns; summary of theoretical conclusions. Graphs, table. 7 ref. (Q25)

580-Q. The Solution of Plane Stress Problems by an Electrical Analogue Method. G. Liebmann. *British Journal of Applied Physics,* v. 6, May 1955, p. 145-157.

Principle of a resistance-network analog method for stress analysis. Diagrams, graphs, tables. 16 ref. (Q25)

581-Q. Tests on Stanchions Bent in Single Curvature About Both Principal Axes. J. W. Roderick. *British Welding Journal,* v. 2, May 1955, p. 217-224.

If all the beams remain elastic,

the stiffness of the minor-axis beams has an important effect on the stanchion collapse load, but the loads on either set of beams have comparatively little influence. Photographs, graphs, tables, diagrams. 3 ref. (Q5, Q21, K general)

582-Q. Assessment of Spot-Weld Quality by Torsion Test. P. Joumat and J. E. Roberts. *British Welding Journal,* v. 2, May 1955, p. 225-233.

Experiments, comparing a torsion test with other methods of assessing quality in low-alloy and plain carbon steel, show that an inspection of the torsion failure gives sufficient information to evaluate weld quality for service without need for mechanical measurements. Tables, graphs, photographs, diagrams. (Q1, K3, CN, AY-n)

583-Q. The Determination of the Elastic Constants of Metals by an Ultrasonic Method. E. G. Ramachandran and N. Srinivasan. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 173-188; disc., p. 259-260.

Elastic constants of polycrystalline metals as well as of single crystals of metals have been determined. Photographs, diagrams, tables. 8 ref. (Q21)

584-Q. Brittle Fracture. T. S. Robertson. *Iron & Steel,* v. 28, May 1955, p. 161-166.

Test methods, theory and mechanism of fractures. Photographs, graphs. (Q26, Q23)

585-Q. Variable Creep Strength. W. E. Bardgett and M. G. Gemmill. *Iron & Steel,* v. 28, May 1955, p. 239-242.

Creep strength results of basic openhearth mild steel, killed with varying amounts of aluminum, show importance of the (residual) soluble aluminum content of the solid steel as a control factor. Graphs, tables. (Q3, CN, Al)

586-Q. Creep and Rupture. J. Glen. *Iron & Steel,* v. 28, May 1955, p. 242-252.

Some additional data on Mo, Cr-Mo and Mo-V steels. Graphs, tables. (Q3, Q4, AY)

587-Q. Precision-Cast High Temperature Alloy. G. T. Harris and H. C. Child. *Iron & Steel,* v. 28, May 1955, p. 252-255.

Statistical study of creep and fatigue properties. Graphs. (Q3, Q7, Co)

588-Q. Creep and Tensile Properties. A. Graham and K. F. A. Walles. *Iron & Steel,* v. 28, May 1955, p. 255-263.

Relationships for a commercial alloy. Tables, graphs. (Q3, Q23, Ni)

589-Q. Propagation of Shock Waves in Aluminum. H. Dean Mallory. *Journal of Applied Physics,* v. 26, May 1955, p. 555-559.

Velocity of shock waves and associated translational motions, produced by metal-metal impact, determined by electrical contact technique. Results used to evaluate equation of state for the metal. Tables, graphs, diagram. 6 ref. (Q general, Al)

590-Q. Internal Friction of an Alloy of 16 Percent Aluminum in Iron. C. Wert. *Journal of Applied Physics,* v. 26, May 1955, p. 640-641.

Measurements of internal friction of "16-Alfenol". Graph. 4 ref. (Q22, Fe, Al)

591-Q. Impact Pressure Loading of Rigid-Plastic Cylindrical Shells. P. G. Hodge, Jr. *Journal of the Mechanics and Physics of Solids,* v. 3, Apr. 1955, p. 176-188.

Considers a shell, loaded for a short time with a pressure greater than the collapse load; expressions for the stresses, velocities and displacements are found in each case. Diagrams, graphs, table. 8 ref. (Q25)

592-Q. On Unsymmetrical Extrusion in Plane Strain. A. P. Green. *Journal of the Mechanics and Physics of Solids,* v. 3, Apr. 1955, p. 189-196 + 3 plates.

Slip-line fields proposed and extrusion pressures calculated for extrusion through a square-die, situated at either end or in the side of a container with smooth or rough walls. A plastic-rigid nonhardening material is assumed. Plasticine experiments reveal deformation and confirm theory. Photographs, diagrams, graph, table. 3 ref. (Q24, F24)

593-Q. X-Ray Microbeam Studies of Brittle Fractures of Metals. Lo-Ching Chang. *Journal of the Mechanics and Physics of Solids,* v. 3, Apr. 1955, p. 212-217 + 1 plate.

Examination of polycrystalline iron and zinc reveals that the plastic strain associated with brittle fracture of both metals can be resolved into two parts: the pre-fracture strain and the fracture strain. Photograph, graphs, table. 8 ref. (Q26, Q23)

594-Q. Researches on the Fatigue Under Consideration of the Phenomenon of Elastic Hysteresis. Minoru Ka-

wamoto and Kunio Nishioka. *Kyoto University, Memoirs of the Faculty of Engineering,* v. 17, no. 1, Jan 1955, p. 1-29.

Relation between stress and strain on the metallic material subjected to the reversed stress and the condition of fatigue limit; effect of shape of cross section of specimen on fatigue limit; relation between the form and notch factors. Diagrams, graphs, tables. 22 ref. (Q7)

595-Q. Modified 18-8 Stainless for Higher Temperatures. *Materials & Methods,* v. 41, May 1955, p. 117-118.

Use of nonstrategic metals to replace nickel. Effects of various modifying elements on mechanical properties at elevated temperatures. Photographs, table. (Q general, SS)

596-Q. Overlay Bearings. J. B. Mohler. *Metal Industry,* v. 86, May 6, 1955, p. 375-378.

Seizing resistance of various alloy combinations. Photographs, table. 10 ref. (Q9, SG-c)

597-Q. Magnetic Measurement of the Hardness of Metals. D. Hadfield. *Metal Treatment and Drop Forging,* v. 22, May 1955, p. 219-224.

Practical application of the method to the nondestructive testing of low-alloy content steel components. Photograph, diagrams, tables, graphs. (To be continued.) (Q29, AY-n)

598-Q. Fatigue Aspects in Aircraft Welding Design. J. Koziarski. *Welding Journal,* v. 34, May 1955, p. 446-458.

Weld residual stresses and stress concentrations and their effects on fatique failure of the welds; weld design criteria. Photographs, micrographs, tables, diagrams. 77 ref. (Q7, Q25, K9)

599-Q. Effect of Welding on Transition Temperature of Nickel Steel Plate. T. N. Armstrong and W. L. Warner. *Welding Journal,* v. 34, May 1955, p. 209S-215S.

Welding does not appreciably lower the transition temperature of low-carbon, 3½% nickel steel plate, particularly if welds are stress-relieved. Graphs, tables, photographs. 3 ref. (Q23, K general, J1, AY)

600-Q. The Static and Fatigue Behavior of Spot-Welded Joints in Titanium. W. H. Kearns, W. S. Hyler and D. C. Martin. *Welding Journal,* v. 34, May 1955, p. 241S-250S.

Spot-welded joints in tension-shear tests were stronger than similar joints in stainless steel and aluminum alloys. They were also stronger in fatigue tests as compared with aluminum alloys but somewhat lower than stainless steel. Tables, diagrams, graphs. 4 ref. (Q7, K3, Ti)

601-Q. (German.) **Effect of Various Alloying Elements on the Properties of Austenitic Chromium-Nickel Steels Showing High Strength at Elevated Temperatures in the Temperature Range of From 600 to 700° C.** Hanns Arnt Vogels. *Stahl und Eisen,* v. 75, no. 9, May 5, 1955, p. 559-570.

Effect of the pretreatment on the hot shaping property, creep strength, tendency to embrittlement, and resistance to scaling. Tables, diagrams, graphs, micrographs. 17 ref. (Q24, Q3, Q23, R2, SS)

602-Q. (German.) **Transformation and Segregation Phenomena in Austenitic Chromium-Nickel Steels at Elevated Temperatures.** Ewald Baerlecken and Walter Hirsch. *Stahl und Eisen,* v. 75, no. 9, May 5, 1955, p. 570-579.

Effect of carbon, silicon, manganese, molybdenum, columbium, nitrogen, titanium and vanadium contents on the structure, magnetic saturation, notch toughness, hardness and resistance to grain disintegration in a boiling copper sulfate-sulphuric acid solution after an annealing treatment of up to 18,500 hr. at 600 to 850° C. Tables, micrographs, graphs. 34 ref. (Q general, R5, SS)

603-Q. (Hungarian.) **Investigation of the Wear Resistance of Modified Cast Iron in Laboratory and Railway-Operation.** Ferenc Varga and Endre Füle. *Ontöde,* v. 6, no. 4, Apr. 1955, p. 85-91.

Wear resistance of calcium-silicate modified cast iron as compared to the ordinary and iron-silicon modified types; improvements in wear resistance. Micrographs. (Q9, CI)

604-Q. (Polish.) **High-Alloy Steels With Nitrogen Addition.** Adam Semkowicz. *Hutnik,* v. 22, no. 1, 1955, p. 8-12.

Variations in heat treatment; strength, hardness and resistance to corrosion and chemical reagents of chromium-nickel steels with and without nitrogen. Tables, micrographs, graphs. 9 ref. (Q23, Q29, J general, R general, AY)

605-Q. (Russian.) **Investigation of the Basic Parameters of the Wear of Gears.** G. I. Skundin. *Avtomobil'naia i traktornaia promyshlennost',* 1955, no. 4, Apr., p. 9-12.

Factors include effect of dust, nonparallelism of grooves, warp and crumpling stresses, period of operation and hardness of gear slots. Photographs, tables. (Q9)

606-Q. (Russian.) **Theory of Small Elasto-Plastic Deformations of Anisotropic Media.** I. I. Gol'denblat. *Doklady Akademii Nauk SSSR,* v. 101, no. 4, Apr. 1, 1955, p. 619-622.

Mathematical analysis. 2 ref. (Q24)

607-Q. (Russian.) **Elastic Twinning of Metals.** V. I. Startsev and V. M. Kosevich. *Doklady Akademii Nauk SSSR,* v. 101, no. 5, Apr. 1, 1955, p. 861-864.

Alternating application and removal of varying stresses or bending and the occurrence of elastic twins; intergranular lattice damage. Micrographs. 6 ref. (Q24, Sb, Bi)

608-Q. (Russian.) **Strength and Plasticity of Metals at Low and Extremely Low Temperatures.** G. V. Uzhik. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 57-66.

Variations resulting in shearing strength; plastic deformation; twinning, etc. Graphs, diagrams, table. 7 ref.

(Q23, Q24, AY, CN, SS, CI, Cu, Al, Cd)

609-Q. (Russian.) **Internal Friction of Steel in Relation to Temper (Thermal) Brittleness.** E. I. Kvashnina and V. I. Prosvirin. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 1, Jan., p. 157-159.

Effect of heating at 500° C. of brittle steel; high-temperature tempering and subsequent heating at 500° C.; effect of molybdenum on steel. Graphs. 3 ref.
(Q22, Q23, ST, Mo, Cr, Mn)

610-Q. Statistico-Mechanical Theory of Deformation, Involving the Activated State. W. James Lyons. *American Journal of Physics,* v. 23, May 1955, p. 268-275.

Relative concentration of activated units; specific rate of transfer; equation for rate of deformation. Diagram, graphs. 17 ref. (Q24)

611-Q. The Stresses in a Simple Supported Reinforced Annular Plate Uniformly Loaded. Irving Granet. *American Society for Naval Engineers, Journal,* v. 67, May 1955, p. 513-520.

Develops equations for the stresses and deflections; compares the material economics in using a reinforced hub. Diagrams. 5 ref. (Q25)

612-Q. The Effect of Trace Impurities on the Properties of Iron. N. P. Allen. *Birmingham Metallurgical Society, Journal,* v. 35, Mar. 1955, p. 169-180.

Experimental results, discussion of the brittleness of iron and its alloys. Graphs, tables, photographs. (Q23, ST, Fe)

613-Q. Test of Corrugated Steel Pipe Culvert at Cullman, Alabama. *Engineer,* v. 199, May 6, 1955, p. 646-647.

Tests on an 84-in. diam. Armco "multi-plate" culvert situated under 137 ft. of fill. Results indicate that such pipe can readily be used under high fills provided that the structure is properly back-filled. Photographs, diagram, graph. (Q23, CN)

614-Q. Creep-Relaxation Testing. Tests at Constant Strain and Decreasing Load. John H. M. Draper. *Engineering,* v. 179, May 6, 1955, p. 564-565.

Method of maintaining constant strain; test procedures; effect of loading at different rates and temperatures. Diagram, graphs. 1 ref. (Q3, AY)

615-Q. Short-Time Creep-Relaxation Tests. Effect of Methods of Loading. S. J. Watson. *Engineering,* v. 179, May 6, 1955, p. 565-566.

Four creep-relaxation tests, carried out at 600° C. with a strain of 0.153% (corresponding to a stress of 20 tons per sq. in. at 20° C.) but differing in the way in which the strain was applied. Diagrams, graphs. (Q3, AY)

616-Q. Fatigue Life of Steel I-Beams At Normal and Sub-Zero Temperatures. J. Dubuc, Jr., T. A. Monti and George Welter. *Engineering Journal,* v. 38, May 1955, p. 607-614, 626.

Testing apparatus; behavior of each type of beam under series of fatigue flexure tests related. Photographs, diagrams, graphs. (Q7, ST)

617-Q. Mechanical Properties of Cast Titanium-Aluminum-Silicon Alloys. H. W. Antes and R. E. Edelman. *Foundry,* v. 83, June 1955, p. 92-95.

Effect of silicon on mechanical properties. Silicon additions up to 1% were made to both 4 and 6% aluminum-titanium alloys. In both series of alloys, an increase of about 4000 psi. was realized for each 0.1% of silicon added. Micrographs, diagram, tables, graphs. 7 ref.
(Q general, Ti)

618-Q. Problems Connected With the Rhombus. II. Plastic Torsion. K. T. Sundara, Raja Iyengar and S. K.

Lakshmana Rao. *Indian Institute of Science, Journal,* v. 37, sec. B, Apr. 1955, p. 113-120.

Relaxation technique used to obtain a numerical solution in the case of plastic torsion. Diagram, graph. 2 ref. (Q1)

619-Q. Inhomogeneous Deformation in Rolling and Wire-Drawing. B. B. Hundy and A. R. E. Singer. *Institute of Metals, Journal,* v. 83, May 1955, p. 401-407.

Relation of the degree of inhomogeneity to conditions of working. Tables, graphs, diagram. 25 ref. (Q24)

620-Q. Deformation and Annealing Textures in Thorium. R. E. Smallman. *Institute of Metals, Journal,* v. 83, May 1955, p. 408-416 + 1 plate.

Work on deformation and annealing textures, of interest from both a practical and a theoretical standpoint. Diagrams, tables, graphs. 34 ref. (Q24, Th)

621-Q. A Preliminary Note on the Creep Properties of Internally Oxidized Copper Alloys. J. W. Martin and G. C. Smith. *Institute of Metals, Journal,* v. 83, June 1955, p. 417-420 + 1 plate.

Creep properties of single-crystal and poly-crystalline specimens determined with and without a dispersed oxide phase. Graphs. 7 ref. (Q3, Cu)

622-Q. Some Observations on the Creep of Pre-Strained Aluminium. G. R. Wilms. *Institute of Metals, Journal,* v. 83, May 1955, p. 427-432 + 2 plates.

Changes which occur in the structure during subsequent creep deformation under constant tensile load at various temperatures. Graphs. 17 ref. (Q3, Al)

623-Q. Rare Earths Improve Impact Properties of 4330. H. Schwartzbart and J. P. Sheehan. *Iron Age,* v. 175, May 26, 1955, p. 103-106.

Rare earths can increase toughness without affecting hardness. Table, graphs. (Q6, AY)

624-Q. Prediction of Creep-Deflection and Stress Distribution in Beams From Creep in Tension. W. N. Findley and J. J. Poczatek. *Journal of Applied Mechanics,* v. 22, June 1955, p. 165-171.

Method of predicting creep in bending from data on creep in tension derived and applied to creep of a canvas laminate. Deflections compared favorably with test data. It was shown that stress distribution remained constant during creep in bending when creep in tension and compression were equal and the coefficient of the time-dependent term was equal to the time-independent term. Methods of determining creep deflections of beams having nonuniform bending moments. Graphs. 24 ref. (Q3)

625-Q. Fracture of Inoculated Iron Under Biaxial Stresses. I. Cornet and R. C. Grassi. *Journal of Applied Mechanics,* v. 22, June 1955, p. 172-174.

Data on fracture of inoculated-iron thin-wall tubes investigated under various ratios of axial to tangential stress, ranging from pure tension to pure compression. Data consistent with published data on gray cast iron. Diagrams, graph. 7 ref. (Q26, CI)

626-Q. The Formation of a Conical Crater in a Thin Plastic Sheet. W. T. Thomson. *Journal of Applied Mechanics,* v. 22, June 1955, p. 175-176.

Deformation of a thin plastic sheet forced by a conical mandrel. Diagram, graphs. (Q24)

627-Q. Further Work on the General Three-Dimensional Photoelastic Problem. Max M. Frocht and Roscoe Guernsey, Jr. *Journal of Applied Mechanics,* v. 22, June 1955, p. 183-189.

A general, practical method of solution. Possible variations in procedure. Diagrams, graphs, table, stress patterns. 14 ref. (Q25)

628-Q. Stress - Concentration Factors in Shafts With Transverse Holes as Found by the Electroplating Method. H. Okubo and S. Sato. *Journal of Applied Mechanics,* v. 22, June 1955, p. 193-196.

Torsion of shafts with transverse holes investigated experimentally. Graph, tables, photographs, diagram. 6 ref. (Q25)

629-Q. Load Distribution at the Intersection of Several Coaxial Axisymmetric Shells. H. Becker. *Journal of Applied Mechanics,* v. 22, June 1955, p. 232-234.

Theory; shear load-distribution cycle, special cases, application of method. Diagrams. (Q25)

630-Q. Solving Highly Complex Elastic Structures in Easy Stages. Gabriel Kron. *Journal of Applied Mechanics,* v. 22, June 1955, p. 235-244.

A systematic procedure solves very large elastic structures, containing hundreds of component elements. Method is not competitive with existing techniques of solving sets of

linear equations but is to be used only when other methods prove inadequate to cope with the capacity of the available computer (slide rule or electronic). Diagrams, graph. 16 ref. (Q25)

631-Q. On the Nonlinear Differential Equation for Beam Deflection. E. J. Scott and D. R. Carver. *Journal of Applied Mechanics,* v. 22, June 1955, p. 245-248.

General solution of nonlinear beam equation given for all problems in which the moment can be expressed as a function of the independent variable alone. Graphs. (Q25)

632-Q. Problems of Plane Elasticity for Reinforced Boundaries. J. R. M. Radok. *Journal of Applied Mechanics,* v. 22, June 1955, p. 249-254.

General method deducted for investigation of stress distribution around compactly reinforced holes in infinite plates. Tables, graphs, diagram. 8 ref. (Q25)

633-Q. Stress Distribution in a Uniformly Rotating Equilateral Triangular Shaft. H. T. Johnson. *Journal of Applied Mechanics,* v. 22, June 1955, p. 255-259.

General method employed which may be applied in obtaining approximate solutions for the stress distribution for rotating prismatic shapes, for the cases of either generalized plane stress or plane strain. Graphs, tables. 6 ref. (Q25)

634-Q. Further Problems in Orthotropic Plane Stress. H. D. Conway. *Journal of Applied Mechanics,* v. 22, June 1955, p. 260-262.

Solution for the infinite orthotropic plate containing an elliptical hole, the plate being subjected to tension at infinity and the axes of the hole and the direction of the tension inclined at arbitrary angles to the principal axes of orthotropy. (Q25)

635-Q. Stresses Due to Diametral Forces on a Circular Disk With an Eccentric Hole. A. M. Sen Gupta. *Journal of Applied Mechanics,* v. 22, June 1955, p. 263-266.

Stresses determined when disk is compressed along the line of centers by two equal and opposite forces acting on its outer edge, the inner edge being unstressed. From results obtained, solution of the problem of a semi-infinite plate acted on by a concentrated normal force on its straight boundary and containing an unstressed circular hole deduced. Tables, graph, diagram. (Q25)

636-Q. Bending of Orthogonally Stiffened Plates. W. H. Hoppmann. *Journal of Applied Mechanics,* v. 22, June 1955, p. 267-271.

Flexure theory for plates of orthotropic material applied in the case of orthogonally stiffened plates using an experimental method to determine plate stiffnesses in bending and in twisting. Diagrams, graphs, tables, photograph. 16 ref. (Q25)

637-Q. A Single-Profile Crystal Extensometer Adjustable for Orientation. A. J. Kennedy. *Journal of Scientific Instruments,* v. 32, May 1955, p. 183-185.

Design of the device. Table, diagrams. 8 ref. (Q27)

638-Q. Directional Properties in Aluminium. P. Grodzinski. *Light Metals,* v. 18, May 1955, p. 155-156.

Use of elongated indenters for determination of hardness variations in aluminum single crystals. Diagrams, graphs, micrograph. 6 ref. (Q29, Al)

639-Q. Brittle Failure of Steel Structures—Theory, Practice, Future Prospects. M. E. Shank. *Metal Progress,* v. 67, June 1955, p. 111-121.

Some important theoretical and experimental developments in the field of inquiry, along with views on present engineering design and fabrication practice and future possibilities. Micrographs, diagrams, graphs. 28 ref. (Q26, Q23, ST)

640-Q. A Slip-Band Exudation Effect Observed in Pure Aluminium. P. J. E. Forsyth and C. A. S. Stubbington. *Nature,* v. 175, Apr. 30, 1955, p. 767-768.

Exudation is thought to be caused by cyclic stresses on a thin sandwich of material depleted of solute atoms. Micrographs. 2 ref. (Q24, Q7, Al)

641-Q. The Outlook on Airframe Fatigue. Walter Tye. *Royal Aeronautical Society, Journal,* v. 59, May 1955, p. 339-348.

Safe life of spars, wing tests, pressure cabin testing, tail planes, present situation and immediate future. Graphs, photographs. 10 ref. (Q7)

642-Q. The Value of Hardness Testing as Inspection Procedure. W. G. Shilling. *Sheet Metal Industries,* v. 32, no. 337, May 1955, p. 373-377; disc., p. 377-384.

Practical aspects of the tests and their application by inspectors. Photographs, table, graph, histograms. (Q29)

643-Q. Friction, Wear, and Surface Damage of Metals as Affected by Solid Surface Films. Edmond E. Bisson, Robert L. Johnson, Max A. Swikert and Douglas Godfrey. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3444, May 1955, 60 p.

Results of investigations, from 1946 to 1954, are consistent with theoretical predictions that solid surface films of low shear strength can serve to reduce both friction and surface damage, with metallic oxides having very marked effects. Graphs, diagrams, micrographs, tables. 48 ref. (Q9)

644-Q. (English.) **Internal Friction in Solid Solutions of Oxygen-Tantalum.** R. W. Powers. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 135-139.

Study to determine if the relative width of a damping curve depends in any manner on the peak height or interstitial atom concentration. Table, diagram, graphs. 8 ref. (Q22, Ta)

645-Q. (English.) **Mechanism of Pore Formation Associated With the Kirkendall Effect.** J. A. Brinkman. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 140-145.

A mechanism proposed by which tensile stress can nucleate voids of a critical size or larger. Diagram. 13 ref. (Q24)

646-Q. (English.) **A Uniaxial Strain Model for a Lüder's Band.** E. W. Hart. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 146-149.

A model is proposed to explain the load-elongation test behavior for a wide range of types of materials which exhibit yield point phenomena in one form or another. Graphs. 7 ref. (Q24)

647-Q. (English.) **Twinning and Accommodation Kinking in Zinc.** A. J. W. Moore. *Acta Metallurgica,* v. 3, no. 2, Mar. 1955, p. 163-169.

Examples described and compared with metallographic sections of the same twins, possible importance in the development of the twin discussed. Diagrams, micrographs, graphs. 16 ref. (Q24, Zn)

648-Q. (Czech.) **Application of Microstructure Analysis for Technology of Plastic Magnesium Alloys.** Petr Skulari. *Hutnické Listy,* v. 10, no. 4, Apr. 1955, p. 209-215.

Advantages of microstructure analysis for technology of plastic magnesium alloys and the influence of hexagonal lattice on the mechanical and technological characteristics of these alloys. Diagrams, graphs, table. 6 ref. (Q general, M27, Mg, Al)

649-Q. (German.) **The Deformability of Anodically Oxidized Pure Aluminium.** Walter Köhler. *Werkstoffe und Korrosion,* v. 6, no. 4, Apr. 1955, p. 169-180.

Influence of various coating-methods on the deformability of anodically oxidized semifinished products and the tendency of the oxide layers to crack under tensile stresses and wear conditions. Graphs, micrographs, tables, photographs. 32 ref. (Q24, L14, Al)

650-Q. (Russian.) **Cast Copper Antifriction Steels.** A. A. Lunev. *Liteinoe Proizvodstvo,* 1955, no. 5, May, p. 15-18.

Effect of lubricants, copper coatings and various heat treatments on the co-efficient of friction of copper-aluminum steel. Other bearing metals and combinations also tested. Micrographs, graphs, tables, phase diagram. 13 ref. (Q9, AY, SG-c)

651-Q. (Russian.) **Increasing the Strength of Welded Rails of New-Type Steels by Means of Mechanical and Heat Treatment of the Butt Joints.** I. Z. Genkin. *Svarochnoe Proizvodstvo,* 1955, no. 5, May, p. 5-9.

Comparison of fatigue strength, etc. of whole rails, bolt joints and rails welded by contact, thermit and other methods. Effect of polishing, annealing, etc. Microstructure of steels at weld union. Tables, graphs, micrographs, diagrams. (Q23, Q7, J general, M27, ST)

652-Q. (Russian.) **Analysis and Application of Certain Criteria of Creep.** I. A. Oding and V. S. Ivanova. *Vestnik Mashinostroeniia,* v. 35, no. 5, May 1955, p. 62-66.

Values of co-efficients of long-range strength and of creep for several steels. Factors affecting plasticity and "reserve" properties and their relation to the period of service before fracturing. Tables, graphs. (Q3, ST)

653-Q. (Book.) **Titanium in Iron and Steel.** George F. Comstock. Alloys of Iron Research, New Monograph Series. 294 p. 1955. John Wiley & Sons, 440 4th Ave., New York 16, N. Y.

Effect of titanium on properties and behavior of carbon and alloy steels and cast iron. (Q general, Ti, CN, AY, CI)

654-Q. (Book—German.) **Testing Metals.** Eugen Hanke. 683 p. 1954. VEB Verlag Technik, Berlin, Germany.

Destructive and nondestructive methods for determining mechanical, physical, chemical, and electrical properties; procedures, testing equipment, preparation of specimens; effect of chemical composition and other factors on properties and structure.

(Q general, P general, S general)

655-Q. A Metallurgical Evaluation of Iodide Chromium. D. J. Maykuth, W. D. Klopp, R. I. Jaffee and H. B. Goodwin. *Electrochemical Society, Journal,* v. 102, June 1955, p. 316-331.

Both the physical condition and the purity of chromium are important factors in its ductility. Small quantities of oxygen, nitrogen, iron, molybdenum, tungsten and silicon have little effect on the bend ductility of chromium. However, nickel, carbon or sulfur adversely affect both the hot and cold ductility. Tables, graphs, micrographs. 13 ref. (Q23, Cr)

656-Q. The Effect of Grinding on the Fatigue Strength of Steels. D. N. Cledwyn-Davies. *Institution of Mechanical Engineers, Proceedings,* v. 169, no. 2, 1955, p. 83-92.

Investigation to determine effects of cylindrical grinding on fatigue strength of a nickel-chromium-molybdenum alloy steel hardened and tempered to give a nominal ultimate stress of 80 tons per sq.in. or 62 tons per sq.in., and carbon steel at 45 or 27 tons per sq.in. Photographs, graphs, diagrams, tables. 9 ref. (Q7, G18, ST)

657-Q. How Important is Hydrogen Embrittlement? N. J. Grant and J. L. Lunsford. *Iron Age,* v. 175, June 2, 1955, p. 92-94.

Hydrogen absorption can permanently affect the ductility of cold worked steel. Micrograph, graphs. 1 ref. (Q23, ST)

658-Q. Reproducibility of Wöhler-Type Fatigue Tests. J. Clayton-Cave, R. J. Taylor and E. Ineson. *Iron and Steel Institute, Journal,* v. 180, June 1955, p. 161-169.

A study of the variabilities of fatigue test results obtained from individual testing machines, a battery of 12 testing machines of identical design, and a number of testing machines of similar design in different laboratories. Tables, diagrams, graphs. 9 ref. (Q7)

659-Q. Effects of Sliding Velocity and Temperature on Wear and Friction of Several Materials. R. L. Johnson, M. A. Swikert and E. E. Bisson. *Lubrication Engineering,* v. 11, May-June 1955, p. 164-170.

Materials, apparatus and procedures, results. Table, diagram, graphs. 17 ref. (Q9, Cu, Ni, CI)

660-Q. A Practical Strain-Hardening Function. E. Voce. *Metallurgia,* v. 51, no. 307, May 1955, p. 219-226.

Relationship between stress and indentation hardness reviewed in the light of the exponential function, and the nature of the fillet connecting the strain hardening curve with the elastic line. Graphs, tables. 13 ref. (Q29)

661-Q. Structural Engineering Aspects. A. M. Freudenthal. Paper from "Building Materials—Their Elasticity and Inelasticity". Interscience Publishers. p. 64-121.

Implications of the rheological behavior of the principal engineering materials in terms of the performance of engineering structures. Diagrams, graphs, table. 9 ref. (Q24)

662-Q. Metals. P. Feltham and M. W. Thring. Paper from "Building Materials—Their Elasticity and Inelasticity". Interscience Publishers. p. 125-188.

Metals in building, heat treatment of steel, engineering and compression tests, shear and tensile stresses, elasticity, creep, fracture, brittle fracture and fatigue. Photographs, graphs, diagrams, tables. 93 ref. (Q general, T26, Cu, Fe, Pb, ST)

663-Q. (English.) **The Theory of Fatigue Fracture of Metals.** Takeo Yokobori. *Physical Society of Japan, Journal* v. 10, no. 5, May 1955, p. 368-374.

Fatigue cracks are assumed to form as a result of a large tensile stress caused by a piled-up group of dislocations, plus an externally applied tensile stress component, with the aid of other stress concentration factors associated with the obstacle or inclusion itself. Diagrams, graphs, table. 30 ref. (Q7)

664-Q. (English.) **Direct Tensile Tests on Standard Rolled Sections Made on Steel A-37.** F. Hebrant and L. Demol. *Acier, Stahl, Steel,* v. 20, no. 4, Apr. 1955, p. 173-177.

Comparison of the values of the elastic limit and of the ultimate strength, as obtained from tensile tests on standard test pieces, with the corresponding values measured by means of direct tensile tests on normal rolled steel sections. Photographs, graphs, diagrams, tables. (Q27, ST)

665-Q. (English.) **Tensile Tests on Riveted Connections of Rolled Sections Made of Steel A-37.** F. Hebrant

and L. Demol. *Acier, Stahl, Steel,* v. 20, no. 4, Apr. 1955, p. 178-184.

Tests were concerned with end connections of standard rolled sections with gusset-plates, such as are met with in small and medium-sized structures. Photographs, graphs, diagrams, tables. 6 ref. (Q27, ST)

666-Q. (English.) **Tangential Modulus in Some Metals Near the Melting Point.** P. G. Bordoni and M. Nuovo. *Nuovo cimento (Supplemento),* v. 1, ser. 10, no. 2, 1955, p. 155-158; disc., p. 158.

Investigation of the elastic behavior of tin, lead and bismuth at high temperature. Graphs. 7 ref. (Q1, Q21, Sn, Pb, Bi)

667-Q. (French.) **A Study of the Microstructure of Plastic Deformation of Solid Solution Copper-Zinc With 65 to 66% Copper and Its Evolution During Annealing. Particular Case of Deformation by Abrasion.** Pierre A. Jacquet. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 307-325; disc., p. 325-326.

Changes during step annealing, up to final stage of typical polygonization, confirmed by X-rays. Micrographs, tables. 12 ref. (Q24, J23, M27, Cu, Zn)

668-Q. (German.) **The Chemical Composition of Gray Iron and Its Tensile Strength.** Paul A. Heller and Hans Jungbluth. *Giesserei,* v. 42, no. 10, May 12, 1955, p. 255-257.

Effect of wall thickness and degree of saturation on tensile strength. Graphs, tables. 15 ref. (Q23, CI)

669-Q. (German.) **The Behavior of Spherical Graphite in the Plastic Deformation of Ductile Cast Iron.** B. Sigg. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 148-150.

Study of the deformation of spheroid graphite in high silicon cast iron subjected to tensile and compression stresses. Micrographs, graph, table. (Q24, CI)

670-Q. (Italian.) **Initial Yielding Phenomena and Luder Lines in Drop Forging of Some Aluminum-Magnesium Alloys.** F. Sacchi and L. Mori. *Alluminio,* v. 24, no. 2, Mar. 1955, p. 121-127.

Appearance of Luder lines on fine-grained and annealed alloys and absence of the lines in coarse-grained and slightly hardened alloys. Photographs, graphs, diagrams. 3 ref. (Q24, F22, Al, Mg)

671-Q. (Polish.) **Heat Resistant Alloys and Their Properties.** E. Lachowski. *Technika lotnicza,* v. 10, no. 3, May-June 1955, p. 73-81.

Strength and anti-corrosion properties, required of alloys used in jet aircraft are given for chromium-nickel steels, and Nimonic and Vitallium alloys. Tables, graphs. (Q23, R general, SS, Cr, Ni, Co, Mo)

672-Q. (Russian.) **Theory of Small Elasto-Plastic Deformations of Anisotropic Media.** I. V. Gol'denblat. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 60-67.

Making use of the general tensor properties of fields of deformation and stresses, the author deduces basic equations for the theory of anisotropic media, relating these to the corresponding equations for the theory of isotropic media. Diagrams. 2 ref. (Q21, Q24)

673-Q. (Russian.) **Propagation of Disturbances in a Nonlinear-Elastic and Inelastic Medium.** Kh. A. Rakhmatulin and G. S. Shapiro. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 2, Feb., p. 68-89.

Impact stressing causes elasto-plastic waves of deformation. Propagation of disturbances in a medium with a nonlinear relation between stress and deformation; in elasto-plastic media; and in elasto-viscous, viscous-plastic, and elasto-viscous-plastic media. At high pressures considerably above the yield point for shear and at high rates of deformation, solids behave like gases. Graphs, diagrams, photographs. 77 ref. (Q6, Q24, Q21)

674-Q. (Russian.) **Problem of Complex Stressing.** L. M. Kachanov. *Prikladnaia Matematika i Mekhanika,* v. 19, no. 3, May-June 1955, p. 371-375.

Theory of elasto-plastic deformations and that of plastic flow; equations for the two theories and their inter-relation. 5 ref. (Q24, Q21)

675-Q. (Russian.) **Nature of Necking During the Tensile Testing of Specimens.** N. N. Davidenkov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 877-880.

Necking during tension is viewed as a result, not of the change of the physical nature of the process of plastic deformation, but of the impairment of the mechanical stability of uniform elongation. Graph. 13 ref. (Q27)

676-Q. (Russian.) **Influence of Molten Metallic Coatings on the Mechanical Properties of Steels and Alloys.** Ia. M. Potak and I. M. Shcheglakov.

Zhurnal Tekhnicheskoi Fiziki, v. 25, no. 5, May 1955, p. 897-907.

Mechanical properties of the alloys determined at the melting temperature of the coating. Comparison of properties of plated and unplated metals at various temperatures. Tables. 4 ref.
(Q general, L general, ST, AY)

677-Q. (Russian.) **Problem of the Nature of the Hardening and Softening of Plastically Deformed Metals. I.** V. N. Danilov. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 916-921.

Relationship between hardening and the coefficient of thermo-electromotive force, and lattice distortion. Temperature of recrystallization determined by measuring the thermo-e.m.f. Graphs, table. 19 ref. (Q24, N5, ST, Cu, Fe, Al)

678-Q. (Russian.) **Character of the Fracturing of Plastic Metals Under the Conditions of the Concentration of Stresses During Tension.** Iu. I. Likhachev. *Zhurnal Tekhnicheskoi Fiziki,* v. 25, no. 5, May 1955, p. 922-932.

Notched specimens tested to show relation of load to position of boundary between elastic and plastic zones; local plastic deformations; shear tests; tangential stresses. Diagrams, graphs. 8 ref. (Q26, Q23, ST)

679-Q. (Swedish.) **Influence of Annealing Treatments at About 650° C. After Work Hardening on Impact Properties of Soft Steels.** G. Sehlberg. *Jernkontorets Annaler,* v. 139, no. 4, 1955, p. 215-224.

Study of low-carbon steels subjected to cold working by stretching and subsequent cold working. Micrographs, graphs, tables.
(Q6, Q24, CN)

680-Q. (Swedish.) **Deformation Phenomena and Aging Effects in Torsion Testing of Cold Drawn Low-Carbon Steel Wire.** Ake Josefsson. *Jernkontorets Annaler,* v. 139, no. 4, 1955, p. 225-249.

A rise in the nitrogen content from 0.003 to 0.006% results in a pronounced decrease in the number of turns to fracture, when a cold drawn low-carbon steel wire is twisted. Tables, graphs, micrographs. (Q1, N7, CN)

681-Q. An Investigation of Strain Aging in Fatigue. J. C. Levy and G. M. Sinclair. *American Society for Testing Materials, Preprint No.* 70, 1955, 22 p.

Application of strain-aging theory to account for a peak in fatigue life occurring at about 450° F. Graphs, photographs, micrographs, diagrams, tables. 34 ref. (Q7, N7, CN)

682-Q. Understressing as a Means of Eliminating the Damaging Effect of Fatigue Stressing. H. E. Frankel and J. A. Bennett. *American Society for Testing Materials, Preprint No.* 71, 1955, 9 p.

Rotating-beam tests of a heat treated alloy steel showed that the fatigue limit could be increased by coaxing. Damaging effect of fatigue stressing 10% above the fatigue limit was eliminated by understressing and coaxing. Tables, graphs. 9 ref. (Q7, AY)

683-Q. The Fatigue Properties of Some Titanium Alloys. A. W. Demmler, Jr., M. J. Sinnott and L. Thomassen. *American Society for Testing Materials, Preprint No.* 72, 1955, 13 p.

Rotating-beam fatigue life characteristics of three commercial titanium alloys: Ti-75A, RC-130B and RC-A-110AT, and two experimental alloys: 6% aluminum, an all-alpha alloy, and 30% molybdenum, an all-beta alloy. Tables, graphs, diagram. 7 ref. (Q7, Ti)

684-Q. Torsion Prestrain and the Fatigue Strength of RC-55 Titanium Alloy. J. G. Kaufman and E. D'Appolonia. *American Society for Testing Materials, Preprint No.* 73, 1955, 14 p.

Rotating-beam fatigue tests. Torsional prestrain ranged from 5 to 60% of the torsional strain to failure. Data from tests of torsionally prestrained specimens compared with data from tests of otherwise similar specimens that had not been prestrained. Tables, graphs. 10 ref. (Q1, Q7, Ti)

685-Q. Anisotropy of Fatigue Strength of a Steel and Two Aluminum Alloys in Bending and in Torsion. W. N. Findley and P. N. Mathur. *American Society for Testing Materials, Preprint No.* 75, 1955, 15 p.

A somewhat similar variation of the fatigue strengths with orientation relative to the texture was observed for all three metals. Fatigue strength in bending decreased as the orientation changed from longitudinal to diagonal to transverse; and the fatigue strength in torsion was nearly constant at all three orientations. Tables, micrographs, diagrams, graphs. 30 ref.
(Q1, Q5, Q7, Al, AY)

686-Q. The Behavior of Long Helical Springs Under Fluctuating Load.

C. L. Staugaitis and H. C. Burnett. *American Society for Testing Materials, Preprint No.* 76, 1955, 6 p.

Machine was constructed for testing long springs, operating on a guide rod, under fluctuating compressive loads. Results of tests on this machine showed that wear on the spring due to the guide rod reduced the life of the long springs far below that of the short springs tested at the same stress range. Photograph, tables, graphs, micrographs. (Q7, Q28, SG-b)

687-Q. The Effect of an Anodic (HAE) Coating on the Fatigue Strength of Magnesium Alloy Specimens. J. A. Bennett. *American Society for Testing Materials, Preprint No.* 77, 1955, 5 p.

Bending fatigue tests of coated and uncoated specimens were made in machines of the constant-amplitude-of-deflection type. Results showed that the coating caused a significant reduction in fatigue strength even when the stress on the coated specimens was calculated on the assumption that all the load was supported by the underlying metal. Table, diagrams, graph, micrographs. (Q7, L19, Mg)

688-Q. Effect of Strain-Rate History on the Creep Behavior of an Alloy Steel at 800° F. H. A. Lequear and J. D. Lubahn. *American Society for Testing Materials, Preprint No.* 78, 1955, 5 p.

Quickly strained specimens had about 30 times the creep rate of slowly strained specimens immediately after being brought to a common stress. Graphs, table. 3 ref. (Q3, AY)

689-Q. Effect of Time and Temperature on Impact and Tensile Properties of Hot-Rolled Low-Carbon Steels During Strain-Aging. F. Garofalo, G. V. Smith and D. C. Marsden. *American Society for Testing Materials, Preprint No.* 79, 1955, 11 p.

Upon straining and aging at 75° F., or exposing strained and fully aged material at 450° F., a pronounced shift in the notch-impact transition-temperature range to higher temperatures was found. Tables, graphs, micrographs. 10 ref. (Q6, Q27, N7, CN)

690-Q. Mechanical Properties of a Magnesium Alloy Under Biaxial Tension at Low Temperatures. Edward Paxson, Joseph Marin and L. W. Hu. *American Society for Testing Materials, Preprint No.* 80, 1955, 13 p.

Properties in both simple and biaxial tension were obtained at various low temperatures. Biaxial tensile properties were determined by the bulge-type test, using a thin circular plate clamped at the edges and subjected to lateral hydrostatic pressures. Photographs, diagrams, graphs. 15 ref. (Q27, Mg)

691-Q. Strength of Bent Copper Tube. G. S. Sangdahl, Jr., and W. M. Baldwin, Jr. *American Society for Testing Materials, Preprint No.* 81, 1955, 20 p.

Provides evidence that, in spite of thinning of the wall, the bursting strength of copper tube is not impaired by bending. Graphs, diagrams, tables, photographs. 14 ref. (Q23, Cu)

692-Q. A Hardness Conversion Table for Copper-Beryllium Alloy Strip. G. R. Gohn. *American Society for Testing Materials, Preprint No.* 82, 1955, 10 p.

For material in the as-rolled condition having a tensile strength within the range of 70,000 to 132,000 psi., conversion values, based upon material having the same tensile strength, are given for diamond pyramid hardness numbers taken with both a 2½ and a 5-kg. load, as well as for the Rockwell B, and Rockwell superficial 30T scales. Tables, graphs. (Q29, Cu)

693-Q. Certain Departures From Plastic Ideality at Large Strains. H. A. Lequear and J. D. Lubahn. *American Society for Testing Materials, Preprint No.* 87, 1955, 20 p.

Studies on high-purity copper to relate the results of creep and tension tests. Diagram, graphs. 17 ref. (Q3, Q27, Cu)

694-Q. A Diameter Gage and Dynamometer for True Stress-Strain Tension Tests at Constant True Strain Rate. G. W. Powell, E. R. Marshall and W. A. Backofen. *American Society for Testing Materials, Preprint No.* 88, 1955, 13 p.

Design of instruments, typical data from tests on type-301 austenitic stainless steel at several strain rates at temperatures of 20 and −196° C. Diagrams, circuit diagram, photograph, graphs. 10 ref. (Q27, SS)

695-Q. An Axial Loading Creep Machine. M. H. Jones and W. F. Brown, Jr. *American Society for Testing Materials, Preprint No.* 89, 1955, 7 p.

Factors influencing the eccentricity of loading in tension testing and a creep machine designed to reduce bending stresses in tension creep to a minimum. Circuit diagram, diagrams, graphs, photographs. 6 ref. (Q3, Q27)

696-Q. A Remotely Operated Extensometer. R. G. Berggren and J. C. Wilson. *American Society for Testing Materials, Preprint No.* 90, 1955, 4 p.

A sensitive extensometer for use in remotely controlled tension testing of radioactive metallic specimens. Diagram, circuit diagram, photograph. (Q27)

697-Q. Reproducibility of Charpy Impact Test. David E. Driscoll. *American Society for Testing Materials, Preprint No.* 93d, 1955, 5 p.

To demonstrate the reproducibility and reliability of the test, a special heat of steel was cut to make 18,000 blanks and heat treated to three energy levels. These specimens were used to make tests on various machines. Graphs, tables. (Q6)

698-Q. The Effect of Heat Treatment and Structure Upon Creep Properties of Nimonic Alloys Between 750 and 950° C. W. Betteridge and R. A. Smith. *American Society for Testing Materials, Preprint No.* 94d, 1955, 11 p.

Results of tests on nickel-chromium-cobalt alloys hardened with titanium and aluminum show that differences in the stress-rupture properties at 750° C., whether due to differences in content of hardening elements or to differences in heat treatment, are maintained at all temperatures up to 950° C. Tables, graphs, micrographs. 9 ref. (Q3, Q4, Ni)

699-Q. Tension and Torsion Tests on Nimonic Alloys at High Temperatures. E. D. Ward and W. G. Tallis. *American Society for Testing Materials, Preprint No.* 94e, 1955, 11 p.

Data obtained in conventional tension and torsion tests, at temperatures from 20 to 1000° C. (70 to 1830° F.), on the nickel-chromium-base alloy Nimonic 75 and 80A and the nickel-chromium-cobalt-base alloys Nimonic 90 and 95. Table, graphs. (Q1, Q27, Ni)

700-Q. Compression-Creep Properties of Several Metallic and Cermet Materials at High Temperatures. L. A. Yerkovich and G. J. Guarnieri. *American Society for Testing Materials, Preprint No.* 94f, 1955, 23 p.

Investigations to develop suitable test apparatus and obtain compression-creep data for various metals and cermets. Tables, diagrams, photographs, graphs. 12 ref. (Q3)

701-Q. Longitudinal Impact Tests of Long Bars With a Slingshot Machine. W. Ramberg and L. K. Irwin. *American Society for Testing Materials, Preprint No.* 93a, 1955, 14 p.

Slingshot machine for making impact tests at the National Bureau of Standards. Results obtained from these tests on bars of steel and copper. Diagrams, photograph, table, graphs. 21 ref. (Q6, CN, Cu)

702-Q. The Impact Tube: A New Experimental Technique for Applying Impulse Loads. George Gerard. *American Society for Testing Materials, Preprint No.* 93c, 1955, 16 p.

Development of an experimental technique for applying loads of an impulsive nature to diaphragms or plates of various shapes. Tables, diagrams, photographs, graphs. 14 ref. (Q6)

703-Q. Influence of Boron on Cast Cobalt-Base S-816 Alloy. W. E. Blatz, E. E. Reynolds and W. W. Dyrkacz. *American Society for Testing Materials, Preprint No.* 94a, 1955, 8 p.

Cast cobalt-base alloys with stress-rupture properties at 1650° F., equivalent to those of S-816 alloy at 1500° F., were developed. Graphs, table, micrographs. (Q4, Co)

704-Q. Effect of Rare Earth Additions on the High-Temperature Properties of a Cobalt-Base Alloy. J. E. Breen and J. R. Lane. *American Society for Testing Materials, Preprint No.* 94c, 1955, 9 p.

Improvements in the high-temperature mechanical properties of a typical cobalt-base alloy were achieved by the addition of rare earths as misch metal. Tables, graphs, photograph. 10 ref. (Q general, EG-g, Co)

705-Q. Interaction of Friction and Temperature at the Chip-Tool Interface in Metal Machining. F. F. Ling and Edward Saibel. *ASME, Transactions,* v. 77, July 1955, p. 693-700.

An approximate analysis of the interface temperature, or cutting temperature, for linear friction-temperature characteristics and small rake angles, for orthogonal metal machining. Graphs, diagrams. (Q9, G17)

706-Q. The Thermal Barrier—Structures. N. J. Hoff. *ASME, Transactions,* v. 77, July 1955, p. 759-763.

Problems encountered are thermal buckling, thermal stresses, creep buckling and creep failure in tension. Graphs, photograph. 4 ref. (Q3, Q25)

707-Q. Failure of a Large Welded Oil-Storage Tank. *British Welding Journal,* v. 2, June 1955, p. 254-263.

Failure was of the 'brittle fracture' type. Studies of analyses, mechanical properties, microstructures

and erection procedures. Diagrams, photographs, tables, graphs. (Q26, K1, CN)

708-Q. Effect of Various Stress-Relieving Treatments on the Behaviour of Welded and Notched Mild-Steel Specimens Under Impact Loading. G. Coates. *British Welding Journal,* v. 2, June 1955, p. 266-275.

Impact tests on notched steel bars into which residual welding stresses were introduced. A comparison between effectiveness of various stress-relieving treatments in improving impact performance. Heat treatment at 650° C. shown to have a greater influence than the other methods of stress relief. Diagrams, graphs, tables, photographs, micrographs. 6 ref. (Q6, J1, CN)

709-Q. Effects of Hydrogen at High Pressures on the Mechanical Properties of Metals. I. Apparatus, Procedures, and Preliminary Results. H. C. Van Ness and B. F. Dodge. *Chemical Engineering Progress,* v. 51, June 1955, p. 266-271.

Embrittlement, not hydrogen attack, appears in steels and other alloys at as low as 2000 atmospheres pressure at room temperature. Tests made up to 4000 atmospheres and to 475° C. show austenitic stainless steel to be most suitable. Tables, diagrams, photographs, micrographs. 11 ref. (Q23, SS)

710-Q. Cumulative Damage in Fatigue: A Method of Investigation Economical in Specimens. John C. Levy. *Engineering,* v. 179, June 10, 1955, p. 724-726.

On the assumption that the scatter of a series of results is due to local conditions pre-existing within each particular specimen, it was presumed that a specimen which showed an unduly long, or an unduly short, life under one applied stress would have shown a similarly long or short life under a different level of stress. Graphs, table. 14 ref. (Q7)

711-Q. The Liability to Fatigue Failure of Aluminium-Alloy Structures. Tibor Haas. *Engineers' Digest,* v. 16, May 1955, p. 253-257.

An approach to the problem through the use of program-loading fatigue testing machines. Photographs, micrographs, graphs, diagrams. 13 ref. (Q7, Al)

712-Q. The Effect of Nitrides and Ternary Intermetallic Compounds on the Young's Modulus of Some Aluminium Alloys. N. Dudzinski. *Institute of Metals, Journal,* v. 83, June 1955, p. 444-448 + 1 plate.

Various binary and ternary aluminum alloys were prepared by chill-casting or sintering and extrusion, and their elastic properties investigated. It was found that the presence of nitrides of aluminum, chromium, magnesium, iron, vanadium and titanium caused an appreciable increase in Young's modulus. Tables, micrographs. 10 ref. (Q21, Al)

713-Q. Plastic Deformation of Aluminium-3.5% Copper Alloy Single Crystals. K. M. Carlsen and R. W. K. Honeycombe. *Institute of Metals, Journal,* v. 83, June 1955, p. 449-454 + 1 plate.

Long crystals of an aluminum-3.5% copper alloy, prepared by the strain-anneal method, enabled a comparison to be made of specimens of identical orientation after different heat treatments. Graphs, micrographs. 10 ref. (Q24, M26, Al)

714-Q. The Significance of Microhardness Testing. A. P. Miodownik. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, June 1955, p. 258-262.

Deviations and scatter encountered in microhardness testing at low loads examined, causes attributed to mechanical and physical characteristics of the testing instrument, operational factors and the microstructure of the specimen. Diagrams. 47 ref. (Q29, M27)

715-Q. Fatigue Life of Airplane Structures. Bo Lundberg. *Journal of the Aeronautical Sciences,* v. 22, June 1955, p. 349-402; disc., p. 403-413.

A survey of the various aspects of the fatigue of complete airplane structures, together with numerical applications. Graphs, tables, photographs. 64 ref. (Q7)

716-Q. Effect of Atomic-Pile Radiation on the Elastic Modulus of an Austenitic Steel. A. Charlesby, N. H. Hancock and H. C. Sansom. *Journal of Nuclear Energy,* v. 1, June 1955, p. 264-279 + 1 plate.

A sensitive method designed for measuring changes in the elastic modulus of a metal during irradiation in an atomic pile. Photographs, tables, graphs, diagram, circuit diagram. (Q21, AY)

717-Q. Materials Engineering File Facts. How Some Elements Affect Steel. *Materials & Methods,* v. 41, June 1955, p. 139.

Relative effects of various elements on steel properties are indicated in table form. Table. (Q general, ST)

718-Q. The Effect of Chromium Plating on the Fatigue Strength of

Steel. C. Williams and R. A. F. Hammond. *Metal Industry,* v. 86, May 27, 1955, p. 435; disc., p. 435-438.

Results of tests to determine fatigue strength of chromium-plated steels at varying heat treatment temperatures. (To be continued.) (Q7, Cr, ST)

719-Q. Adaptation of Bergsman Microhardness Tester to American Optical Metallograph. E. W. LaRocca. *Review of Scientific Instruments,* v. 26, June 1955, p. 590-591.

Advantages of the combined system are its simplicity, speed and improved accuracy, and reduction in wear of moving parts. Photograph, diagrams. (Q29)

720-Q. Precision Measurement of Diamond Indentors for Rockwell Hardness Testing. F. R. Tolmon and Joyce F. Hall. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 447-451.

Development of methods for the measurement of the cone angle and tip radius of diamond indentors and a brief statement of experience gained in the inspection of indentors during the past few years. Diagrams, micrographs. 1 ref. (Q29)

721-Q. Stress Probing—A Rapid Method for Stress-Surveying. N. Gross and P. H. R. Lane. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 1-8.

Method of determining stresses in structural members or pressure components which can be subjected to cyclic loading. Photographs, graphs, diagrams. 6 ref. (Q25)

722-Q. High-Speed Universal Fatigue Testing Machine. Verification of Statically Calibrated Mechanical-Optical Dynamometer. M. Russenberger and G. Földes. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 9-20.

Working principles and applications of fatigue testing machine. Use of a statically calibrated mechanical-optical dynamometer as a load indicator for dynamic tests. Photographs, diagrams. (Q7)

723-Q. Prediction of Fatigue Failures in Aluminum Alloy Structures. C. R. Smith. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 21-28.

Predictions for a part having a given theoretical stress concentration factor and loading condition. Residual strain calculations. Diagrams, graphs. 7 ref. (Q7, Al)

724-Q. Allowable Stresses for Thin Metal Structural Elements at Elevated Temperatures. E. A. Zeitlin. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 29-44.

Typical elastic constants at elevated temperatures are summarized for 18-8 steel, Inconel X and titanium. Curves displaying the variation of several effective moduli with stress given. Graphs, tables, photographs. 14 ref. (Q25, SS, Ni, Ti)

725-Q. Dynamic Stress Measurements in Gas Turbines. R. A. Berger and A. W. Brunot. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 45-54.

Use of high-temperature strain gages. Photographs, diagrams, graphs. (Q25)

726-Q. Tests of the Conducting Paper Analogy for Determining Isopachic Lines. W. F. Stokey and W. F. Hughes. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 77-82.

Studies of a bar having a centrally located hole, loaded in tension, and for a square plate with compressive loads applied at opposite corners. Photograph, graphs. 4 ref. (Q25)

727-Q. The Moiré Method—A New Experimental Method for the Determination of Moments in Small Slab Models. F. K. Ligtenberg. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 83-98.

Determination of the stress distribution in laterally loaded plates. Graphs, diagrams, photographs. 15 ref. (Q25)

728-Q. New Progress in Our Knowledge About the Moment Distribution in Flat Slabs by Means of the Moiré Method. C. G. J. Vreedenburgh and H. van Wijngaarden. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 99-114.

Experiments, carried out with small slab models, to find maximum slab moments simulating circumstances met in practice, i.e., taking into account the correct shape of column head and drop panel, the presence of marginal beams and other discontinuities in the construction, various load systems, etc. Diagrams, photographs. 6 ref. (Q25)

729-Q. An Analysis of Plastic Behavior of Metals With Bonded Birefringment Plastic. J. D'Agostino, D. C. Drucker, C. K. Liu and C. Mylonas. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 115-122.

Sheets of photo-elastic material were bonded to metal parts to pro-

vide a means of measuring the plastic strains in the surface of the metal. Diagrams, photographs. 6 ref. (Q25)

730-Q. Epoxy Adhesives and Casting Resins as Photoelastic Plastics. J. D'Agostino, D. C. Drucker, C. K. Liu and C. Mylonas. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 123-128.

Results on the elastic and photoelastic properties of epoxy resins: Armstrong C-1, C-2, C-4, C-6, C-9, Cycleweld C-14, Araldite CN501, CN502. Tables, graphs, photographs. 9 ref. (Q25)

731-Q. Experiments on Composite Models With Applications to Cemented Joints. C. Mylonas. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 129-142.

Photo-elastic analysis of composite structures. Diagrams, photographs, graphs, table. 20 ref. (Q25)

732-Q. Isochromatic Fringe Sharpening and Fringe Multiplication in Photoelasticity. D. Post. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 143-156.

Experimental techniques for obtaining an isochromatic pattern that exhibits several times as many fringes as the conventional pattern. Diagrams, graphs, photographs, table. (Q25)

733-Q. Quantitative Three-Dimensional Photoelasticity. M. M. Leven. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 157-172.

Evaluation of degree of accuracy to be expected from use of normal or tangential slices in determining two-dimensional stress distributions on the free surfaces of three-dimensionally stressed models into which the stresses have been fixed or "frozen". Photographs, diagrams, tables, graphs. 15 ref. (Q25)

734-Q. Elimination of the Transient Strain Fluctuations Which Result From Longitudinal Impact of Bars. J. M. Krafft. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 173-180.

Studies of nature and origin of strain waves; ways to eliminate them in impact and collision testing. Diagrams, graphs, table. 11 ref. (Q6)

735-Q. Creep in Bonded Electric Strain Gages. H. Matlock and S. A. Thompson. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 181-188.

Room-temperature creep tests. Creep of considerable magnitude (as much as 16% of the applied strain) observed. Diagrams, graphs, photograph. 11 ref. (Q3, Q25)

736-Q. Bending of Rotating Beams. J. B. Tiedemann, T. E. Paradue and I. Vigness. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 189-200.

Mild steel cylinders, while rotating about their axes, were bent transversely by forces applied perpendicular to their lengths. Diagrams, graphs, table. 5 ref. (Q5)

737-Q. New Apparatus for Study of Deformation of Clamped Circular Plate Loaded With Lateral Pressure. W. H. Hoppmann, II. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 201-206.

Bolts normally used to provide edge clamping in plate tests of this type have been made unnecessary by use of a lever device for producing clamping pressures through a uniform centering head. A device is also provided for assuring that the peripheral load on the edge of the circular plate be uniform. Photograph, diagrams, graph. 7 ref. (Q24, Q25)

738-Q. Interatomic Bond Strength and Static Distortions in Crystals of Alloyed Ferrite. V. A. Il'ina and V. K. Kritskaya. *Henry Brutcher Translation No.* 3511, 7 p. (From *Doklady Akademii Nauk SSSR,* v. 100, no. 1, 1955, p. 69-72.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 388-Q, 1955. (Q24, M26, J general, Fe, Mo, Ce, Mn, Nb, V)

739-Q. (English.) **Fatigue of Metals—Our Knowledge and the Deficiencies in Our Knowledge.** P. L. Teed. *Metalen,* v. 10, no. 10, May 31, 1955, p. 147-151.

Effect of surface treatment on fatigue properties. Tables. 67 ref. (To be continued.) (Q7)

740-Q. (English.) **Studies of Fatigued Railway Rails. I. Decision on the Degree of Fatigue of Railway Rails by a Magnetic Flaw Detector.** Ichiro Konishi, Minoru Kawamoto, Hideo Miki, Masao Adachi, Bunji Kondo, Jin-ichi Takamura, Yoshiji Niwa and Hisao Goto. *Kyoto University, Engineering Research Institute Technical Reports,* v. 5, no. 2, Mar. 1955, p. 19-52.

Relation between magnetic flaw detecting record of rails and dynamic character and fatigue or breakage of business track rails.

Photograph, graphs, diagrams, tables, micrographs. 5 ref. (Q7, S13)

741-Q. (Czech.) **Micro-Examination of Dynamic Fatigue.** Petr Skulari and Vladivoj Ocenasek. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 279-284.

Suppositions for the practical use of the examination and results obtained for aluminum and its alloys under alternating dynamic loads. Physical principles of fatigue related to material in annealed and hardened conditions. Graphs, micrographs, diagrams, table. 9 ref. (Q7, Al)

742-Q. (Czech.) **Effect of Tungsten Upon Tendency to Temper Brittleness.** Josef Cadek. *Hutnické Listy,* v. 10, no. 5, May 1955, p. 285-293.

Effect of tungsten on the transition temperature of chromium, chromium-vanadium and chromium-nickel steels. Graphs, table, photograph. 19 ref. (Q23, AY, W)

743-Q. (French.) **Studies of the Solid State at High Temperature Carried Out by Means of Ultrasound.** Piero Giorgio Bordoni. *Journal de physique et le radium,* v. 16, no. 4, Apr. 1955, p. 285-291.

Elastic and inelastic properties of metals in the vicinity of their melting point; relation between increase of temperature and the values of Young's modulus and the shear modulus. Graphs, tables. 18 ref. (Q21, Q22)

744-Q. (French.) **Influence of Temperature on the Poisson Coefficient of Refractory Steels.** Louis Raymondin. *Métaux, Corrosion-Industries,* v. 30, no. 355, Mar. 1955, p. 93-104.

Poisson coefficient obtained from data based on combined torsion and bending tests. Influence of a structural change on Poisson coefficient. Diagrams, tables, photograph, graphs, micrographs. 12 ref. (Q21, AY)

745-Q. (German.) **Adaptation of the General Buckling Formula to the Conditions Prevailing in Aluminum Structural Parts.** K. Sutter. *Aluminium,* v. 31, no. 5, May 1955, p. 215-217; disc., p. 217-218.

Formula to compute the resistance of aluminum bars to torsion, bending, or localized buckling under compressive stress. Graph, photograph. 1 ref. (Q1, Q5, Q28, Al)

746-Q. (German.) **High Creep-Resistant Cast Aluminum Alloys With Magnesium and Silicon.** H. Vosskühler. *Aluminium,* v. 31, no. 5, May 1955, p. 219-222.

Data on creep-stress resistance and other mechanical properties of aluminum alloys with 5 to 6% magnesium, 1.7 to 2.0% silicon and about 0.5% copper. Tables, graphs. 7 ref. (Q3, Al)

747-Q. (German.) **The Present Status of Measuring Stresses With X-Rays.** Viktor Hauk. *Archiv für das Eisenhüttenwesen,* v. 26, no. 5, May 1955, p. 275-278.

Factors to be considered in the X-ray method of measuring stresses in metals; advantages of measuring lattice constants and stresses with the counting-tube goniometer. Graphs, tables. 28 ref. (Q25, M26)

748-Q. (German.) **A Dimensionless Characteristic Factor for the State of Flow of Solids.** Th. Pöschl. *Osterreichisches Ingenieur-Archiv* v. 9, no. 1, 1955, p. 22-24.

When determining factors which influence the state of flow of solids, the density must be excluded because the inertia forces in these materials vanish against the cohesive forces. Furthermore it is necessary to introduce the creep rate instead of the strain in Hooke's law. The "viscosity" of solids will then come out as a quantity of the same dimension as the viscosity of liquids. Graph. (Q24)

749-Q. (German.) **Properties of Steel as to Its Behavior in Welded Constructions.** E. Houdremont and H. J. Wiester. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 16-23.

Behavior of iron under mechanical stress; effect of stress distribution, stress velocity, temperature and structure; economic aspects in the choice of structural steels; weld stresses. Photographs, tables, graphs. 21 ref. (Q25, K general, ST)

750-Q. (German.) **Safety and Quality in Different Types of Welded Construction.** K. Klöppel. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 38-65.

Analyses of the causes of weld failures; factors to be considered in the choice of structural steels; effect of treatment of steels and weld joints on strength of welded structure. Photographs, micrographs, tables, diagrams, graphs. 24 ref. (Q23, K general, ST)

751-Q. (German.) **Correct and Incorrect Design of Weld Constructions.** F. W. Griese. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 89-100.

Practical considerations of nature and shape of material, notch effects,

type of seam, effect of heterogeneous torsional rigidity and ductility on strength of structural part, elastic and plastic deformations, rigidity with respect to general design. Diagrams, photographs. 10 ref. (Q general, K general)

752-Q. (German.) **The Hardness of Metals. Relationship Between Hardness and Tensile Strength.** E. Kappler. *VDI Zeitschrift,* v. 97, nos. 15-16, May 15, 1955, p. 479-485.

Mathematics of the elastic and plastic deformations of ball-impression hardness testing; plastic behavior of slightly cold worked materials; equations of state of plastic deformations from Brinell hardness; tensile correlation of Brinell hardness to tensile test. Graphs, diagram. 5 ref. (Q27, Q29)

753-Q. (Russian.) **Contact Stresses and Fatigue Fractures of Babbitt Bearings for Automobiles and Tractors.** M. I. Baulin. *Avtomobil'naia i traktotrnaia promyshlennost',* 1955, no. 5, May, p. 17-19.

Babbitt linings tested for fatigue by repeated bending and compression accompanied by the force of friction on the surface of the material. Patterns of crumbling and cracks are established. Photographs, diagrams. (Q7, SG-c)

754-Q. (Russian.) **Contemporary Problems of the Theory of Plasticity.** A. A. Il'iushin. *Moskovskogo Universiteta Vestnik, Seriia Fiziko-Matematicheskikh i Estestvennykh Nauk,* 1955, nos. 4-5, Apr.-May, p. 101-113.

Theories of small elasto-plastic deformations, plastic flow, creep of metals, strength of structural materials and concrete, etc. 45 ref. (Q23, Q24, Q3)

755-Q. (Russian.) **Wear of Cutters With Mineral-Ceramic Disks.** V. I. Zhikharev. *Stanki i Instrument,* v. 26, no. 5, May 1955, p. 14-16.

Factors affecting cutter life, such as density of grain packing and homogeneity of ceramic material; four classifications derived, based on grain structure and size; wear of cutters in connection with machining of various steels, brass, copper, etc. Micrographs, graphs. (Q9, G17, ST, Cu)

756-Q. (Swedish.) **A Comparison Between Impact Test Pieces According to Schnadt and to Charpy.** Cyrill Schaub. *Jernkontorets Annaler,* v. 139, no. 5, 1955, p. 326-346.

Comparison between these types of test pieces based on determinations of the position of the lower boundary of the transition range, defined as the highest temperature at which no single impact value exceeds 2 kg.-m. per sq. cm. Diagrams, photographs, graphs, tables. 9 ref. (Q6)

757-Q. (Pamphlet.) **Effect of Hydrogen on the Mechanical Properties of Titanium and Titanium Alloys.** Summary Report Under Contract no. DA-33-019-ORD-938. G. A. Lenning, C. M. Craighead, and R. I. Jaffee. PB 111568. 83 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C $2.25.

On various high-purity and commercial-purity specimens, hydrogen is shown to be an impurity which must be kept under control to obtain maximum advantage. The mechanism of hydrogen embrittlement of titanium and alpha alloys differs from that of alpha-beta alloys. (Q23, Ti)

758-Q. (Pamphlet.) **Hydrogen Contamination in Titanium and Alloys. I. Hydrogen Embrittlement in Alpha-Beta Titanium Alloys.** PB 111620. 185 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $4.75.

Hydrogen contamination in alpha-beta alloys can cause low ductility in slow strain rate, room-temperature tensile tests, and premature brittle fracture in room-temperature rupture tests. (Q23, Ti)

759-Q. (Book.) **Society for Experimental Stress Analysis, Proceedings,** (Annual Volume), v. 12, no. 2, 1955, 206 p. Society for Experimental Stress Analysis, Central Square Station, P. O. Box 168, Cambridge 39, Mass.

Individual papers are separately abstracted. (Q general)

760-Q. **The Stress-Rupture Strength of Type 347 Stainless Steel Under Cyclic Temperature.** E. E. Baldwin. *American Society of Mechanical Engineers, Paper No.* 54—A-231, 1954, 17 p. + 5 plates.

Stress-rupture tests of type 347 stainless steel were conducted in liquid sodium under constant and cyclic temperature conditions. Constant-temperature tests were conducted at temperatures between 1000 and 1200° F. and cycle times ranged from 6 to 12 hr. Tables, diagrams, photographs, graphs, micrographs. 11 ref. (Q4, SS)

761-Q. **Electromachining and Superfinishing as a Production Tool. II. The Finishing of Highly Stressed**

Parts. A. T. Steer. *Electroplating and Metal Finishing,* v. 8, July 1955, p. 245-249.

Essential requirements of finishes for highly stressed parts; effect of mechanical and electrolytic polishing treatments on fatigue limit; methods of reinforcing surfaces which have been weakened by electropolishing. Micrographs. 3 ref. (Q7, G19, L13, ST)

762-Q. Residual Stresses in Castings. A. Portevin and J. Pomey. *Foundry Trade Journal,* v. 99, July 7, 1955, p. 9-18.

Procedures for revealing, measuring and classifying the presence or state of residual stresses, their distribution and intensity; factors promoting the origination and modification of the state of stress; influence of stresses on the existence, behavior and use of metallic components; results which apply to castings. Diagrams, graphs. (Q25)

763-Q. Tensile Properties of Some Titanium Alpha Solid Solutions up to 600° C. J. W. Suiter. *Institute of Metals, Journal,* v. 83, June 1955, p. 460-464 + 1 plate.

The ultimate tensile stress and elongation to fracture measured for two series of binary titanium alloys, one containing nitrogen, oxygen or carbon, the other containing aluminum, tin or zirconium. Graphs. 6 ref. (Q27, Ti)

764-Q. How to Select Wrought Steels. John W. W. Sullivan. *Materials & Methods,* v. 42, July 1955, p. 111-126.

A manual to aid in selecting and making better and more economical use of rolled and forged steel products. Factors and properties to be considered when choosing a steel to meet requirements of a particular application; properties of carbon, alloy, stainless and heat resisting steels. Photographs, tables. 33 ref. (Q general, CN, AY, SS)

765-Q. Examination of Microstructures Under Varying Stress. Richard A. Flinn and Paul K. Trojan. *Metal Progress,* v. 68, July 1955, p. 88-89.

A bend test apparatus that permits continuous microscopic examination of metal specimens while they are being loaded to fracture. Photograph, micrographs. (Q5, M27)

766-Q. Properties of Arc-Cast Molybdenum. Norman L. Deuble. *Metal Progress,* v. 68, July 1955, p. 105-110.

High-temperature strength is increased by alloying to higher levels than that obtained with conventional gas-turbine alloys. Tables, graphs. (Q general, Mo)

767-Q. Effect of Neutron Radiation on Aluminum Alloys. R. V. Steele and W. P. Wallace. *Metal Progress,* v. 68, July 1955, p. 114-115.

Increase in tensile and yield strength and decrease in ductility of annealed samples by neutron irradiation. Graphs, tables. (Q23, Al)

768-Q. Performance Tests on Rockwell Hardness Indentors. R. S. Marriner. *Metalworking Production,* v. 99, June 24, 1955, p. 1145-1149.

To establish an irreproachable standard of hardness, it is necessary to determine to what extent reproducibility of the standard is limited by the choice of indentor used. Preliminary work carried out at National Physical Laboratory. Tables, diagrams, graphs. (Q29)

769-Q. You Can Prevent Fatigue Failures. J. J. McKetta and W. G. Dudley. *Petroleum Refiner,* v. 34, July 1955, p. 127-128.

Mechanisms of fatigue failures, methods of testing and of detecting incipient fatigue failures. 9 ref. (Q7)

770-Q. Pressure Pulsation Tests Show Why Branch Connections Fail. A. R. C. Markel, H. H. George and E. C. Rodabaugh. *Pipe Line Industry,* v. 3, July 1955, p. 32-38.

Probable causes of failure, welding, design, superimposed loadings, test methods, apparatus, procedure and results. Tables, diagrams, photographs. 2 ref. (Q26, K general)

771-Q. Stress Equations for Strain Gage Rosettes. C. C. Perry and H. R. Lissner. *Product Engineering,* v. 26, July 1955, p. 207, 209, 211.

A table of equations prepared as a convenient reference for calculating significant stresses from measured strains. Tables. (Q25)

772-Q. Buckling of Sandwich Cylinders of Finite Length Under Uniform External Lateral Pressure. Milton E. Raville. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1844-B, May 1955, 30 p. + 15 plates

A theoretical analysis made to obtain a solution for the critical load on circular sandwich cylinders. Tables, diagrams, graphs. 6 ref. (Q28)

773-Q. Stress-Rupture Strength of Thermenol. (Digest of "Preliminary Investigation of Stress-Rupture and Tensile Strength of Thermenol, an Iron-Aluminum Alloy", by Charles A. Gyrogak; *U. S. National Advisory Committee for Aeronautics, Research*

Memorandum M-E54F10, Aug. 1954.) *Metal Progress,* v. 68, July 1955, p. 164-166.

Investigation to determine stress-rupture life at 1100 and 1200° F., room-temperature tensile strength, and bend ductility. (Q4, Fe, Al)

774-Q. **Tensile Properties of Some Sheet Materials Under Rapid-Heating Conditions.** George J. Heimerl and John E. Inge. *U. S. National Advisory Committee for Aeronautics, Research Memorandum* L55E12b, June 1955, 10 p.

Materials tested at temperature rates from 0.2 to 100° F. per sec. under constant-load conditions. Graphs. 6 ref. (Q27, Al, Ni, Ti)

775-Q. **Evaluation of the Theory on the Post-Buckling Behaviour of Stiffened, Flat, Rectangular Plates Subjected to Shear and Normal Loads.** W. K. G. Floor and T. J. Burgerhout. *Netherlands Nationaal Luchtvaartlaboratorium Report* S.370, 1951, p. 9-36.

Determination of stresses and strains and the required stiffener cross sections of stiffened plates subjected to compressive and shear loads. Tables, diagrams, graphs. (Q25)

776-Q. **Investigation of the Post-Buckling Effective Strain Distribution in Stiffened, Flat, Rectangular Plates Subjected to Shear and Normal Loads.** W. K. G. Floor. *Netherlands Nationaal Luchtvaartlaboratorium Report* S.427, July 1953, 26 p.

Diagrams from which the largest effective strain can be determined. Tables, diagrams. (Q25)

777-Q. (English.) **Scatter in Fatigue Life of 24S-T Alclad Specimens With Drilled Holes.** Waloddi Weibull. *SAAB Aircraft Company, Technical Notes, SAAB TN 32,* 1955, 17 p.

Fatigue lifetimes of specimens determined at a tension pulsating between 14 kg. per sq.mm. and zero. Marked difference existed in fatigue properties of the different plates and also between longitudinal and transverse specimens in regard to the direction of rolling, but an average distribution function for each source was obtainable. Tables, diagram, graphs. (Q7, Al)

778-Q. (French.) **The Symmetry of Textures of Rolled Uranium.** Anatole Winogradzki. *Comptes rendus,* v. 240, no. 23, June 6, 1955, p. 2235-2237.

Analysis of X-ray symmetry diagrams of very pure uranium specimens. Diagrams, X-ray diffractograms. (Q24, U)

779-Q. (French.) **Study of Correlations Between Different Mechanical Tests of Current Gray Irons.** Francois Danis and Etienne Doat. *Fonderie,* 1955, no. 111, Apr., p. 4451-4464.

Tensile-bending, tensile-shearing, shearing-elastic modulus and tensile-hardness correlations of 20 and 30-mm. diam. bars. Influence of heterogeneity of structure. Graphs, tables, diagrams. 6 ref. (Q2, Q5, Q27, Q29, CI)

780-Q. (French.) **Influence of Phosphorus on the Correlation Between Brinell Hardness and Other Characteristics of Gray Irons.** Jean Guillamon. *Fonderie,* 1955, no. 112, May, p. 4513-4525.

Determination of mechanical properties; values of equivalent carbon content. Graphs, phase diagrams, tables. 38 ref. (Q29, CI)

781-Q. (German.) **Relation Between Appearance of Deformation of Twin Crystals and Type of Fracture in Alpha-Iron.** Herbert Buchholtz, Franz Braumann and Albert Eier. *Archiv für das Eisenhüttenwesen,* v. 26, no. 6, June 1955, p. 337-344.

Influence of rate of uniaxial stress and temperature on type of fracture and appearance of the deformation of twin crystals for four types of steel subjected to different heat treatments. Photographs, micrographs, graphs, diagram, tables. 5 ref. (Q21, Q26, Fe)

782-Q. (German.) **Effects of Corpuscular Radiation on Hardenable Alloys.** B. Neumann and E. Schmid. *Metall,* v. 9, no. 9-10, May 1955, p. 349-352.

Alpha, beta and neutron rays did not affect hardness but increased the electrical resistance of 2.15% beryllium, 97.85% copper alloy. Tables, graphs. 8 ref. (Q29, P15, Cu)

783-Q. (German.) **Plastic Cages for Antifriction Bearings and Emergency-Running Properties of Plastics.** A. Gremer. *VDI Zeitschrift,* v. 97, no. 17, June 11, 1955, p. 509-515.

Comparative tests on the effect of pressure, rate of rotation and lubricating conditions on the wear resistance of different plastic materials, brass and steel. Diagrams, tables, graphs. 22 ref. (Q9, Cu, ST)

784-Q. (German.) **The Strength of Metals as an Atomic-Physical Phenomenon.** W. Kossel. *VDI Zeitschrift,* v. 97, no. 17, June 11, 1955, p. 516-518.

Effect of crystal growth and lattice structure on the mechanical properties of metals. Diagrams, photographs. 2 ref. (Q23)

785-Q. (German.) **Internal Stresses and the Incompatibility Tensor in the Theory of Elasticity.** Ekkehart Krö-

ner. *Zeitschrift für angewandte Physik,* v. 7, no. 5, May 1955, p. 249-257.

Development of theories of external and internal stresses in analogy to electrostatics and the theory of magnetic fields. Table, diagrams. 27 ref. (Q21)

786-Q. (Norwegian.) **Strain-Gage Measuring. Range of Application and Practical Utilization.** Just Fr. Storm. *Teknisk Ukeblad,* v. 102, no. 20, May 19, 1955, p. 411-417.

Designs and uses of different strain-gages and extensometers. Diagrams, photographs, graph, map, oscillograms. (Q25)

787-Q. (Russian.) **Dislocation of the Deep Energy Layers of Iron Atoms During Cold Deformation of the Metal.** A. I. Krasnikov, L. I. Sotnikova and L. G. Orlov. *Doklady Akademii Nauk SSSR,* v. 102, no. 5, June 11, 1955, p. 943-945.

Loads of 45,000 and 80,000 kg. per sq.cm. were used; effect of alloying elements; relation between levels and valence; duplet distances calculated. Table. 6 ref. (Q24, Fe, AY)

788-Q. (Russian.) **Quantitative Determination of Wear of Machine Parts With Radioactive Indicators.** Iu. S. Zaslavskii and G. I. Shor. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 4, Apr., p. 43-52.

Comparison with results by suspension method; testing equipment and methods; choice of lubricants. Diagrams, graphs, tables, oscillogram. 15 ref. (Q9)

789-Q. (Russian.) **Temperature Effect on the Plasticity and Deformation Resistance of Technical Titanium.** E. M. Savitskii and M. A. Tylkina. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1955, no. 4, Apr., p. 53-57.

Microstructure, tensile and compression strength, hardness, etc., of carbon and carbon-free titanium, tempered and untempered. Graphs, micrographs, diagrams. 4 ref. (Q general, Ti)

790-Q. (Russian.) **Nitrogen in Cast Iron.** L. I. Levi. *Liteinoe Proizvodstvo,* 1955, no. 6, June, p. 22-25.

Experimental investigation of the influence of nitrogen content in cast iron on its structure and mechanical properties. Tables, micrographs. 10 ref. (Q general, M27, CI)

791-Q. Fatigue Analysis of Aircraft Bolts. Harold G. Brilmyer. *Aeronautical Engineering Review,* v. 14, July 1955, p. 48-54.

Tension fatigue tests of alloy steel and aluminum Huckbolt installations, as well as standard aircraft (AN) bolt-nut combinations. Method for determining the tensile preload present in an installed fastener. Tables, graphs, diagrams, photographs. 19 ref. (Q7, Al, AY)

792-Q. A Theory of Fatigue Damage Accumulation in Steel. D. L. Henry. *American Society of Mechanical Engineers, Paper No.* 54-A-77, 1954, 10 p. + 2 plates.

Simple theoretical model for predicting change in endurance limit resulting from the accumulation of overstressing cycles at moderate levels of overstress and for moderate degrees of fatigue damage. Tables, graphs. 14 ref. (Q7, ST)

793-Q. A New Fatigue-Testing Machine Capable of Inducing Complex Stress-Time Relationships in Its Specimen. W. L. Starkey and S. M. Marco. *American Society of Mechanical Engineers, Paper No.* 54—A-80, 1954, 8 p. + 3 plates.

Design of machine for investigating the effects of multiharmonic complex uni-axial stresses on the endurance lives of metals. Photographs, diagrams, graphs. (Q7)

794-Q. The Influence of Tap-Drill Size and Length of Engagement Upon the Strength of Tapped Holes. C. J. Oxford, Jr., and J. A. Cook. *American Society of Mechanical Engineers, Paper No.* 54—A-85, 1954, 13 p. + 5 plates.

Influence of minor diameter of threaded hole on strength of threaded assembly. Table, diagrams, graphs. 9 ref. (Q23)

795-Q. Fatigue: The Problem and Some Solutions. G. R. Gohn. *American Society of Mechanical Engineers, Paper No.* 54—A-87, 1954, 6 p. + 2 plates.

Causes and mechanism of fatigue. Examples given to show that properly designed laboratory tests will yield fatigue data which can be applied to the solution of design problems. Micrographs, graphs, photograph. 8 ref. (Q7)

796-Q The Statistical Nature of Friction. E. Rabinowicz, B. G. Rightmire, C. E. Tedholm and R. E. Williams. *American Society of Mechanical Engineers, Paper No.* 54—LUB-2, 1954, 5 p. + 2 plates.

Sliding experiments carried out using copper surfaces in solid contact; friction traces analyzed statistically to study the spontaneous

fluctuations in the friction force. Results suggest that the calculation of the standard deviation of the values of the instantaneous friction force can yield much information about the nature of the sliding process. Diagram, graphs. (Q9, Cu)

797-Q. Friction in a Close-Contact System. Walter Claypoole. *American Society of Mechanical Engineers, Paper No.* 54—LUB-6, 1954, 11 p. + 2 plates.

Attempt to clarify the terms "clean" and "smooth" as associated with the surface condition of test specimens used in investigations of frictional phenomena. A "practical model" of a close-contact friction system is set up and its behavior analyzed under specified operating conditions. Photographs, diagrams, graphs, micrographs. 7 ref. (Q9)

798-Q. A Progress Report on the Surface Endurance Limits of Engineering Materials. G. J. Talbourdet. *American Society of Mechanical Engineers, Paper No.* 54—LUB-14, 1954, 13 p. + 4 plates.

Surface-wear tests to determine the load-life characteristics of materials subjected to rolling, combined rolling and sliding actions. Tables, graphs, photographs, micrographs. 7 ref. (Q9)

799-Q. Thermal Shock. Some Experiments With Cast Iron. E. R. Evans. *British Cast Iron Research Association. Journal of Research and Development,* v. 5, June 1955, p. 643-654 + 12 plates.

Various designs of test pieces investigated and most suitable design employed to study the effects of variations of composition on the thermal shock resistance of cast iron. Tables, photographs, diagrams. 4 ref. (Q general, CI)

800-Q. Strains in Flanged Pipes. J. Y. Davies and E. J. Heeley. *British Welding Journal,* v. 2, July 1955, p. 293-297.

Comparisons between pipes of built-up and integral construction using the electrical resistance strain gage technique to determine the distribution and magnitude of strains produced under bolt loading conditions. More extensive welds add neither to strength nor safety. Graphs, diagrams, photographs. (Q25, K9)

801-Q. Design of a Comprehensive Computer for Handling Complex Creep Problems. I-II. A. J. Kennedy. *Engineer,* v. 200, July 1, 1955, p. 2-4; July 8, 1955, p. 34-35.

Consideration of the creep factor under conditions where stress and temperature are not kept constant; examination of the possibility of computing the behavior fairly rapidly from the minimum experimental data. Diagram, graphs, photograph. 16 ref. (Q3)

802-Q. A New Method of Analysing the Stresses and Strains in Deposited Coatings. H. J. Pick. *Institute of Metal Finishing, Transactions, Advance Copy No.* 3, v. 32, 1955, 15 p.

Derivation of formulas, based on changes in dimension, in terms of a parameter called the "linear free strain", defined as that strain which a deposited coating would undergo in a direction parallel to the base if it were deposited on an infinitely thin base of no mechanical strength. Diagrams, graphs, table. 4 ref. (Q25, L17)

803-Q. Creep Behaviour at 300° C. of a Group of Precipitation-Hardening Alloys Based on the Alpha Copper-Aluminium Phase. J. P. Dennison. *Institute of Metals, Journal,* v. 83, July 1955, p. 465-471 + 1 plate.

Results of experiments to provide creep data in various initial states and over a wide range of applied stresses and at a temperature where any structural changes in the unstressed condition take place at extremely slow rates, if at all. Tables, micrographs, graphs. 11 ref. (Q3, J27, Al, Cu)

804-Q. Mechanical Twinning in Molybdenum. R. W. Cahn. *Institute of Metals, Journal,* v. 83, July 1955, p. 493-496 + 2 plates.

An investigation to find mechanical twins in molybdenum that have the same structure as iron and to apply complete crystallographic tests to establish firmly that they are twins. Diagrams, table, micrographs, photographs. 16 ref. (Q24, Mo)

805-Q. Cast Iron at Elevated Temperatures. *Iron & Steel,* v. 28, July 1955, p. 363-364.

An extensive survey of the literature and results of preliminary tests on 12 commercial cast irons. Tables, graphs. (Q general, CI)

806-Q. Residual Plastic Strains Produced by Single and Repeated Spherical Impact. J. A. Pope and A. K. Mohamed. *Iron and Steel Institute, Journal,* v. 180, July 1955, p. 285-297.

Investigation, theoretically and experimentally, of the maximum plastic strain and its penetration

below the surface of a metal, resulting from single and repeated spherical impact. Variables studied were the velocity, energy and diameter of the indentor. Table, graphs, diagrams. 18 ref. (Q6, ST)

807-Q. Cermets—New High-Temperature Materials. Robert Steinitz. *Jet Propulsion,* v. 25, July 1955, p. 326-330.

Specific characteristics of cermets and the general requirements for high-temperature material. Diagrams, graphs, micrograph, photograph, table. 15 ref.
(Q general, H general, SG-h)

808-Q. On the Buckling of Stringer Panels Including Forced Crippling. P. P. Bijlaard. *Journal of the Aeronautical Sciences,* v. 22, July 1955, p. 491-501.

Analysis considers the effective moment of inertia of the stiffeners when located on one side of the plate and the effective width of the plate at the unloaded edges, and the effects of shear deformation of the stiffener web and the flexibility of the attached flange of the stiffener. Diagrams, graphs, table. 12 ref. (Q28)

809-Q. Elastic Constants of Germanium Between 1.7° and 80° K. M. E. Fine. *Journal of Applied Physics,* v. 26, July 1955, p. 862-863.

The elastic constants as well as the Young's and shear moduli approach constant values for very low temperatures as the third law of thermodynamics requires. Table, graphs. 7 ref. (Q21, Ge)

810-Q. Condition of High-Velocity Ductile Fracture. E. Orowan. *Journal of Applied Physics,* v. 26, July 1955, p. 900-902.

Circumstances surrounding the fracture of a sheet of pure aluminum foil. Diagrams. (Q26, Al)

811-Q. Practical Design Aspects of Fatigue Limits. *Mechanical World and Engineering Record,* v. 135, July 1955, p. 294-297.

Comparison of fatigue limits of ferrous and nonferrous metals; effects of loading conditions. Graphs, photograph. (Q7)

812-Q. Magnetic Measurement of the Hardness of Metals. D. Hadfield. *Metal Treatment and Drop Forging,* v. 22, June 1955, p. 239-244.

Development of portable instrument for big-end steel bushes in motor-cycle engines and the results obtained. Photograph, table, diagram, graphs. 94 ref. (Q29, ST)

813-Q. Experimental Investigation of Shear Strength and Shear Deformation of Unstiffened Beams of 24 S-T Alclad With and Without Flanged Lightening Holes. Gunnar Anevi. *SAAB Aircraft Company, Technical Notes, SAAB TN* 29, 59 p.

Determination of shear intensity at failure and at commencement of permanent deformation and initial stiffness. Diagrams, tables, graphs, photographs. (Q2, Al)

814-Q. Transfer of Longitudinal Load From One Facing of a Sandwich Panel to the Other by Means of Shear in the Core. Charles B. Norris and Kenneth H. Boller. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1846, Apr. 1955, 30 p.

Determination of shear stresses in the core and direct stresses in the facings of a sandwich panel at points where the construction is changed or at the edge of the panel. Graphs, photographs, diagrams.
(Q2, Q25)

815-Q. Shearing Effectiveness of Integral Stiffening. Robert F. Crawford and Charles Libove. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3443, June 1955, 37 p.

Values of coefficients for defining the effectiveness of integral stiffeners in resisting shear deformations of the plate of which they are an integral part presented for a wide range of proportions of rectangular stiffeners with circular fillets. Graphs, diagrams. 11 ref.
(Q2, Q25)

816-Q. Preliminary Investigation of the Compressive Strength and Creep Lifetime of 2024-T3 (Formerly 24-S-T3) Aluminum-Alloy Plates at Elevated Temperatures. Eldon E. Mathauser and William D. Deveikis. *U. S. National Advisory Committee for Aeronautics, Research Memorandum* L55E11b, June 1955, 12 p.

Testing of plates supported in V-grooves, comparison of tensile and compressive creep lifetime. Graphs. 4 ref. (Q3, Al)

817-Q. The Physical and Mechanical Properties of Beryllium Metal. D. W. Lillie. Paper from "The Metal Beryllium". American Society for Metals, p. 304-327.

Data on the properties which define and restrict the current utility of beryllium. Tables, graphs. 40 ref. (Q general, P general, Be)

818-Q. The Relation of Purity to Brittleness in Beryllium. A. R. Kaufmann. Paper from "The Metal Ber-

yllium". American Society for Metals, p. 367-371.

Critical review of conclusions that impurities are not responsible for brittleness in the light of recent work which has shown that ductility exists in certain crystallographic directions in beryllium single crystals of nominal purity. Table. 3 ref. (Q23, Be)

819-Q. Ductility of Beryllium as Related to Single Crystal Deformation and Fracture. G. L. Tuer and A. R. Kaufmann. Paper from "The Metal Beryllium". American Society for Metals, p. 372-424.

Large single crystals can be prepared by direct solidification from the melt in a suitably shaped mold and under proper cooling conditions. The important aspects of the deformation and fracture processes are slip, twinning, kinking, deformation bands, deformation at room temperature, effect of temperature on deformation and fracture. Diagrams, photographs, tables, micrographs. 29 ref. (Q23, Q24, Be)

820-Q. Ductility of Beryllium as Related to Preferred Orientation and Grain Structure. J. L. Klein, V. G. Macres, D. H. Woodard and J. Greenspan. Paper from "The Metal Beryllium". American Society for Metals, p. 425-465.

Review of effect of fabrication variables on ductility of beryllium, study of metallurgical factors which affect room temperature ductility of beryllium and development of methods for producing beryllium rod and sheet which have much more ductility than previously considered possible for this metal. Diagrams, graphs, micrographs, tables, photograph. 10 ref.
(Q23, Q24, M27, Be)

821-Q. (English.) **Tensile Properties of Annealed Tantalum at Low Temperatures.** J. H. Bechtold. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 249-254.

Yield strength increased to 125,000 psi at −195° C. but a brittle-type fracture developed in this range. Tables, graphs, diagram. 17 ref. (Q23, Ta)

822-Q. (English.) **The Formation of Mechanical Twins.** N. Thompson and M. Hingley. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 289-291.

Measurements of stress required to cause the appearance of twins in single crystals of cadmium, both in tension and in compression. Tables, diagram. 5 ref. (Q24, Cd)

823-Q. (English.) **Double-Valued Internal Friction Behavior.** H. K. Birnbaum. *Acta Metallurgica,* v. 3, no. 3, May 1955, p. 297-299.

Single crystals of sodium chloride, silver and aluminum relate type I (large hysteresis) and type II (small hysteresis) behavior. Graphs. 3 ref. (Q22, Ag, Al)

824-Q. (English.) **The ΔE-Effect and Young's Modulus in Nickel-Cobalt Alloys.** Mikio Yamamoto and Satoshi Taniguchi. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 7, no. 1, Feb. 1955, p. 35-49.

Measurements in annealed nickel-cobalt alloys, covering the whole composition range, made at ordinary temperatures by the method of magnetostrictive vibration. Table, graphs. 22 ref. (Q21, P16, Ni, Co)

825-Q. (English.) **On the Two Types of Kink Band in Aluminium Crystals.** T. Ichiyama and M. Kurihara. *Technology Reports, Tohoku University,* v. 19, no. 2, 1955, p. 192-200.

Differences between the two types of deformation bands, namely, the kink band and the band of secondary slip. Diagrams, micrographs. 11 ref. (Q24, Al)

826-Q. (French.) **Form of Tensile Curves of Refined Aluminum Monocrystals.** Bernard Jaoul and Paul Lacombe. *Comptes rendus,* v. 240, no. 25, June 20, 1955, p. 2411-2413.

Properties of the point of inflection and the form of deformation curves with refined aluminum monocrystals of various orientations, prepared after machining by critical cold working. Diagrams. 6 ref. (Q27, Al)

827-Q. (French.) **Lowering of the Yield Point of Annealed AG5 by a Second Annealing Following a Weak Deformation.** M. Renouard and H. Stelljes. *Revue de métallurgie,* v. 52, no. 5, May 1955, p. 392-396.

After a brief deformation, followed by a nonrecrystallizing annealing, the yield point of some aluminum-magnesium alloys is lower than that obtained by a single annealing or by two consecutive annealings without intermediary deformation. Diagrams, graphs. 3 ref. (Q23, J23, Al, Mg)

828-Q. (French.) **Failure of Working Pieces and Safety in Using Steels Functioning in Machine Parts.** A. Fotiadi. *SIM—Documentation Métallurgique,* 1955, no. 21, Jan., Feb., Mar., p. 9-30.

Types of permanent deformation, cracks and failure due to fatigue, general behavior of steels under endurance conditions. Diagrams. (Q7, S21, ST)

829-Q. (German.) **Characteristics and Applications of Microhardness.** I. H. Bückle. *Metall,* v. 9, nos. 13-14, July 1955, p. 549-554.

Defines microhardness and shows errors in the determination technique. Table, graphs, diagrams. 36 ref. (Q29)

830-Q. (German.) **Magnetic Investigation of Internal Stress of Carbon Steel Under Plastic Deformation.** Ludwig Reimer. *Zeitschrift für angewandte Physik,* v. 7, no. 6, June 1955, p. 282-284.

Comparison of X-ray and magnetic methods of study; magnetization curve after plastic deformation and its dependence on the temperature of heat treatment. Graphs. 10 ref. (Q25, Q24, CN)

831-Q. (Italian.) **Experimental Researches on the Anisotropy of Extruded Sections of High-Strength Light Alloys.** F. Gatto and L. Mori. *Alluminio,* v. 24, no. 3, May 1955, p. 241-247.

Minimum mechanical strength corresponds to a 45° angle to the direction of extrusion, while the elongation attains its maximum value for the same angle; minimum resilience is found in cross grained test rods. Pattern of fracture undergoes gradual change, depending on the angle of the tested rod with the direction of extrusion. Diagrams, micrographs, tables, graphs. 5 ref. (Q23, EG-a)

832-Q. (Japanese.) **The Effect of Tellurium Additions on Cast Iron.** Bin-ichi Kawamura and Junzo Aono. *Metals (Japanese),* v. 25, no. 7, July 1955, p. 493-497.

Relation of hardness to the percentages of tellurium added to the molten iron and its effect on resulting microstructure. Photograph, micrographs, graphs, tables. (Q29, M27, CI, Te)

833-Q. (Polish.) **The Effect of Aluminum Additions on the Annealing and Properties of Black-Heart Malleable Cast Iron From the Cupola.** Jan Raczka. *Przeglad Odlewnictwa,* v. 4, no. 4, Apr. 1954, p. 99-104.

Effect of aluminum on cementite-pearlite transformations; hardness and strength during annealing at 950 and 710° C. Tables, micrographs, graphs. 6 ref. (Q29, Q23, J23, N8, Al, CI)

834-Q (Polish.) **Substitute Alloys for the Tin Bronzes Used in Casting Production.** Zbigniew Gorny and Krzysztof Rutkowski. *Przeglad Odlewnictwa,* v. 4, nos. 7-8, July-Aug. 1954, p. 196-205.

Necessity for economizing on tin and copper has led to the designing of special bronzes and brasses, with aluminum, iron, nickel and manganese contents; examples of tin-phosphorus, tin-zinc and tin-zinc-lead bronzes; strength, hardness and other tests. Tables, graphs, diagrams. (Q23, Q29, Cu)

835-Q. (Russian.) **Study of the Strength of Connections of Main Girders of All-Welded Span Structures.** D. I. Navrotskii. *Svarochnoe Proizvodstvo,* 1955, no. 7, July, p. 4-7.

Distribution of stresses, with static and vibration loads; effect of shape of connections. Diagrams, photographs, tables, graphs. 3 ref. (Q23, K1, ST)

836-Q. **The Comparison of the Fatigue Characteristics of New and Used Crankshafts.** J. L. Ciringione. *American Society of Mechanical Engineers, Paper No.* 55—OGP-5, 1955, 7 p. + 1 plate.

Effect on fatigue strength of various methods of reconditioning of worn crankshafts. Table, graphs, photographs. (Q7, CN)

837-Q. **On the Loss of Texture in Tapes of a 50 Pct Ni-50 Pct Fe Alloy.** S. Spachner and W. Rostoker. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Aug. 1955, p. 921-922.

Analyses of preferred orientations in tapes of various thicknesses. Effect of heat treatment on developed pole figures. Diffraction patterns, diagrams. 1 ref. (Q24, Fe, Ni)

838-Q. **Some Optical Considerations in the Design of a Polariscope & in Photoelastic Stress Analysis.** V. Cadambe and R. K. Kaul. *Journal of Scientific & Industrial Research,* v. 14, sec. B, Feb. 1955, p. 41-50.

Optical design of a polariscope, steps required in measurement of fringe orders, errors and methods for their determination. Photographs, diagrams, circuit diagram. 8 ref. (Q25, S13)

839-Q. **Impact Failure of Gear Teeth.** Arthur J. Kauper. *Metal Progress,* v. 68, Aug. 1, 1955, p. 73-76.

Failure of transmission gear teeth was traced to variation in impact strength that followed the ingot pattern in the bar stock from which they were made. Photographs, graphs, diagrams. (Q6, ST)

840-Q. **Fatigue of Aluminum Alloys.** (Digest of "Fatigue of Aluminum", by R. L. Templin; presented at the Chicago Meeting of the American Society for Testing Materials, June

15, 1954.) *Metal Progress,* v. 68, Aug. 1, 1955, p. 170, 172, 174, 176.

Mechanism of fatigue failures; factors affecting fatigue strength. (Q7, Al)

841-Q. Fatigue Failure After Chromium Plating. (Digest of "Fatigue Cracking of Two Chromium-Plated Crankshafts". *British Engine Boiler and Electrical Insurance Co., Ltd., Technical Report,* v. 2, Sept. 1954, p. 165-177.) *Metal Progress,* v. 68, Aug. 1, 1955, p. 186, 188.

Chromium plating should not be used for parts which will be subjected to alternating stresses in service, unless the plating rate is slow, the deposits are very thin and the parts are heat treated above 570° F. after plating. (Q7, L17, ST, Cr)

842-Q. How to Curb Chrome-Plate Fatigue. J. E. Stareck, E. J. Seyb and A. C. Tulmello. *Steel,* v. 137, Aug. 8, 1955, p. 82-83.

This trouble, greater in high strength steels, is controlled by a new chromium plating process. Graphs. (Q9, L17, Cr)

843-Q. Wear Resistance of Steel Surfaces. V. V. Chernyshev. *Henry Brutcher Translation No.* 3450, 9 p. (Abridged from *Vestnik Mashinostroeniya,* v. 32, no. 9, 1952, p. 54-57.) Henry Brutcher, Altadena, Calif.

Study of wear of various steels at different sliding speeds and specific pressures between two cylindrical bodies, one of which is stationary, the other rotating. Tables, diagrams, photograph. 2 ref. (Q9, ST)

844-Q. Factors Affecting Directional Properties in Aluminum Wrought Products. Kent R. Van Horn. Paper from *American Society for Metals, Transactions,* v. 47, p. 38-76.

Rolling and recrystallization preferred orientation in aluminum alloy sheet; correlation of preferred orientation with directional properties. Graphs, tables, diagrams, photograph. 12 ref. (Q24, N5, Al)

845-Q. Application of Cottrell's Theory of Yielding to Delayed Yield in Steel. John C. Fisher. *American Society for Metals, Transactions,* v. 47, p. 451-462.

A simple analysis of the Cottrell yield point mechanism; quantitative description of the delayed-yield phenomenon as observed in steels by Clark and Wood. Diagram, graphs, table. 8 ref. (Q23, CN)

846-Q. The Effects of Twisting on Tungsten Wires at High Temperatures. Takeo Fukutomi. *American Society for Metals, Transactions,* v. 47, p. 599-604.

Sample wires were first twisted and then released after a definite time of heating. The ratios of the angle of free rotation after releasing to the angle of given torsion were measured at various temperatures. Diagram, graph. 5 ref. ((Q1, W)

847-Q. Delayed Failure and Hydrogen Embrittlement in Steel. R. P. Frohmberg, W. J. Barnett and A. R. Troiano. *American Society for Metals, Transactions,* v. 47, p. 892-925.

Delayed failure may occur over a wide range of relatively low applied stresses depending upon strength level, notch acuity and aging time after the introduction of hydrogen. The sensitivity to delayed failure may persist even though conventional tensile results indicate full ductility. The observed reductions in ductility are a function of both the depth of hydrogen penetration and the degree or severity of hydrogen embrittlement. Tables, graphs, photographs. 49 ref. (Q26, Q23, ST)

848-Q. Effects of Variation in Normalizing and Tempering Procedure on Stress-Rupture Strength, Creep Embrittlement and Notch Sensitivity for a Cr-Mo-V and a 17 Cr-4Ni-4Cu Steel. M. H. Jones, D. P. Newman, G. Sachs and W. F. Brown, Jr. *American Society for Metals, Transactions,* v. 47, p. 926-954; disc., p. 954-956.

Both notch sensitivity and smooth ductility, for both alloys, are greatly influenced by the heat treatment. High normalizing temperatures are particularly damaging to the ductility and the notch strength of the Cr-Mo-V steel. Tables, diagrams, graphs, micrographs. 15 ref. (Q4, Q23, AY)

849-Q. The Effect of Time and Temperature on Various Mechanical Properties During Strain Aging of Normalized Low Carbon Steels. F. Garofalo and G. V. Smith. *American Society for Metals, Transactions,* v. 47, p. 957-983.

Effect of aging time and temperature, after plastic straining in tension or compression, on the notch-impact transition temperature range, yield strength, tensile strength and hardness investigated for three low-carbon steels in normalized condition. Tables, graphs. 26 ref. (Q23, N7, CN)

850-Q. The Tensile Properties of Molybdenum at Elevated Tempera-

tures. J. W. Pugh. *American Society for Metals, Transactions,* v. 47, p. 984-1001.

Analysis of the tensile properties as a function of temperature. It is concluded that the excellent high-temperature strength of this metal is due to strain aging. Tables, graphs, diagram, micrographs. 12 ref. (Q27, N7, Mo)

851-Q. Effect of Hydrogen on the Properties of Alloys. N. A. Galaktionova. *Henry Brutcher Translation No.* 3448, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 99, no. 3, 1954, p. 411-413.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 243-Q, 1955.
(Q general, P general, CI, Ni, Al)

852-Q. (English.) **The Strains and the Energy in Thin Elastic Shells of Arbitrary Shape for Arbitrary Deformation.** Erich S. Weibel. *Zeitschrift für angewandte Mathematik und Physik,* v. 6, no. 3, May 1955, p. 153-189.

Fundamental equations of equilibrium and motion, methods for the solution of these equations for special cases. Diagrams, graph. 5 ref. (Q25, Q24)

853-Q. (French.) **Standardization of Tensile Specimen Procedure for the Chevenard Micromachine in the Examination of Cast Aluminum Alloy Pieces.** Claude Mascré. *Fonderie,* 1955, no. 113, June, p. 4551-4559.

Results of tests on standardization of Chevenard microspecimens and comparative study of these specimens. Diagrams, tables, micrographs. 4 ref. (Q27, Al)

854-Q. (German.) **On the Calculation of Strengths of Conical Bottoms.** R. Wahl. *Forschung auf dem Gebiete des Ingenieurwesens,* v. 21, Ausgabe B, no. 3, 1955, p. 75-86.

A method of approximation for the calculation of stress distribution in conical bottoms which are annularly supported. Diagrams, graphs, photographs. 25 ref. (Q25)

855-Q. (English.) **The Yield Point in Single Crystal and Polycrystalline Metals.** A. H. Cottrell. Paper from "L'état solide". Institut International de Physique Solvay, p. 487-503; disc., p. 504-513.

Experimental and theoretical work. Effects of impurities on yield points of single crystals. Graphs. 41 ref. (Q23)

856-Q. (English.) **The Dynamics of Slip.** E. Orowan. Paper from "L'état solide". Institut International de Physique Solvay, p. 535-565; disc., p. 566-576.

Cause of the discrepancy between the calculated and observed values of the yield stress. Origin of dislocation mills, strain hardening. Diagrams. 32 ref. (Q24, N7)

857-Q. (French.) **The Elasticity of the Crystalline Medium.** Jean Laval. Paper from "L'état solide". Institut International de Physique Solvay, p. 273-312; disc., p. 313.

Mathematical analysis of the atomic theory of crystalline elasticity, excluding the hypothesis of central forces. 21 ref. (Q21)

858-Q. (Book.) **Strength of Materials. Pt. I. Elementary Theory and Problems.** S. Timoshenko. 3rd Ed. 442 p. 1955. D. Van Nostrand Co., Inc. 250 Fourth Ave., New York 3, N. Y. $6.50.

Considers tension and compression, stress-strain analysis, bending moment and shearing force, and strain energy and impact under various loading conditions as an approach to an increased correlation between the strength of materials and engineering design. (Q23)

859-Q. Strength of Small Metal Specimens. Conyers Herring. *Bell Laboratories Record,* v. 33, Aug. 1955, p. 285-289.

Properties of "ideal crystals" and crystals without any imperfections of structure, in the study of dislocation. Photographs, graph, diagrams. (Q23, M26)

860-Q. Young's Modulus of Alloys. III. Cast Alloys of Cu-Zn Systems. Ichiro Iitaka and Toshimasa Morooka. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 69-70.

Variations of Young's modulus on annealing of cast brasses; relation between Young's modulus and the percentage of zinc. Graphs, table. (Q21, Cu)

861-Q. The Flexural Fatigue Strength of Coin Dimpled 75S-T Aluminium Alloy Sheet. S. W. Gee and J. Y. Mann. *Commonwealth of Australia, Dept. of Supply, Research and Development Branch,* A.R.L./S.M. 215, Dec. 1954, 7 p. + 9 plates.

Hot dimpling produced the best fatigue properties; fatigue strength reduction factor of cold dimpled specimens was comparable to that of drilled holes suitable for the same diameter rivet; at low stresses, the fatigue strengths approached those of the unnotched material. Tables, diagrams, micrographs, graphs. 3 ref. (Q7, G2, Al)

862-Q. A Typical Problem in Engineering: Determine the Interference

Fit and Resulting Stresses in the Design of a Cold Extrusion Die. Charles R. Bradlee. *General Motors Engineering Journal,* v. 2, July-Aug. 1955, p. 38-39.

Determination of an interference fit to produce piston pins from low-carbon steel. Diagrams. 4 ref. (Q25, CN)

863-Q. The Elastic Plastic Theory of Containers and Liners for Extrusion Presses. M. R. Horne. *Institution of Mechanical Engineers, Proceedings,* v. 169, no. 4, 1955, p. 107-117; disc., p. 118-122.

Design of containers and liners for steel extrusion based on elastic-plastic behavior, anomalies considered. Tables, graphs, diagrams. 13 ref. (Q21, Q23)

864-Q. Plastic Flow in a Converging Conical Channel. R. T. Shield. *Journal of the Mechanics and Physics of Solids,* v. 3, July 1955, p. 246-258.

Mathematical analysis of the flow of a plastic-rigid material forced through a rigid conical-shaped channel or die. Diagrams, graphs. 11 ref. (Q24)

865-Q. On the Contribution of Crystallographic Fibring to Hardening Under Uniaxial Straining Conditions. J. F. W. Bishop. *Journal of the Mechanics and Physics of Solids,* v. 3, July 1955, p. 259-266.

In the development of a deformation texture, in certain face-centered cubic metals, on the tensile and compressive strength, isotropic materials harden approximately equally in tension and compression for logarithmic strains up to 0.3. Graphs. 15 ref. (Q27, Q28, Q29)

866-Q. Average Warping in the Torsion of Thin-Walled Open-Section Beams. A. H. Chilver. *Journal of the Mechanics and Physics of Solids,* v. 3, July 1955, p. 267-274.

It is suggested that in the theory of nonuniform torsion of thin-walled beams it is strictly relevant to define average longitudinal warping as the mean value taken over the whole cross-sectional area. Diagrams, graphs. 2 ref. (Q1)

867-Q. The Effect of Prestraining in Simple Tension and Biaxial Tension on Flow and Fracture Behaviour of a Low Carbon Deep-Drawing Steel Sheet. F. Garofalo and J. R. Low, Jr. *Journal of the Mechanics and Physics of Solids,* v. 3, July 1955, p. 275-294.

The effect produced in the rolling direction of a fully killed steel sheet was determined in subsequent tension at 0, 22.5, 45, 67.5 and 90° to the rolling direction; under bi-axial tension, the effect was determined at 0 and 45°. Diagram, graphs, table. 30 ref. (Q27, Q24, Q26, CN)

868-Q. Neutrons, Gamma Rays, & Wear. A. Hunderé, G. C. Lawrason and J. P. O'Meara. *Lubrication Engineering,* v. 11, July-Aug. 1955, p. 230-237.

Brief summary of experiences and results obtained in utilizing the radio-active tracer technique for studying wear. Photographs, diagrams, graphs, table. 5 ref. (Q9, S19)

869-Q. Atoms Trace the Wear. W. R. Miller and H. R. Jackson. *Lubrication Engineering,* v. 11, July-Aug. 1955, p. 238-241.

Radio-active piston ring technique, a new tool for measuring engine wear. Tables, graphs. (Q9, S19)

870-Q. Evaluating Bearing Materials Under Boundary Lubrication. B. Lunn. *Lubrication Engineering,* v. 11, July-Aug. 1955, p. 255-259; disc., p. 259-260.

Test to determine the ability of a metal to develop a nonscoring boundary film. Diagrams, graphs, phototgraphs, tables. 10 ref. (Q9, SG-c)

871-Q. The Influence of Moisture on the Friction & Surface Damage of Clean Metals. R. O. Daniels and A. C. West. *Lubrication Engineering,* v. 11, July-Aug. 1955, p. 261-266.

Controlled atmosphere, low-speed friction apparatus for fundamental boundry lubrication studies. Photographs, micrograph, graphs, diagrams. 13 ref. (Q9)

872-Q. Flexural Strength. L. H. Symes. *Machine Design,* v. 27, Aug. 1955, p. 163-168.

Practical approach to the determination of bending strengths for different materials and section shapes and the organization of analytical data for design analysis. Table, diagrams, graphs. 4 ref. (Q5)

873-Q. Metal Transfer and the Wear Process. M. Kerridge. *Physical Society, Proceedings,* v. 68, no. 427B, July 1955, p. 400-407.

A radio-active, annealed steel pin rubbing against a hardened steel ring is used to compare the amount of wear with the amount of metal transferred from one surface to the other by welding. Using a combination of radio-active and inactive test pieces, the rate of transfer to the ring in the equilibrium con-

dition was estimated and found to be the same as the wear rate of the pin. Graphs. 13 ref. (Q9, ST)

874-Q. Softer Blades Stand Stress Better in the J47. E. M. Phillips and R. E. Weymouth. *SAE Journal,* v. 63, Aug. 1955, p. 60-62.

Investigation of softer blades showed preferable qualities of resistance to stress corrosion, impact strength, heat treatment, and machinability. Graphs.
(Q7, R1, J general, G17)

875-Q. Axial-Load Fatigue Properties of 24S-T and 75S-T Aluminum Alloy as Determined in Several Laboratories. H. J. Grover, W. S. Hyler, Paul Kuhn, Charles B. Landers and F. M. Howell. *U. S. National Advisory Committee for Aeronautics, Report* 1190, 1954, 25 p.

Results obtained in the determination of the fatigue properties of 24S-T3 and 75S-T6 aluminum alloys widely used in airframe construction. Photographs, diagrams, graphs, tables, micrographs. 12 ref. (Q7, Al)

876-Q. Calibration of Strain-Gage Installations in Aircraft Structures for the Measurement of Flight Loads. T. H. Skopinski, William S. Aikens, Jr., and Wilber B. Huston. *U. S. National Advisory Committee for Aeronautics, Report* 1178, 1954, 29 p.

A basic calibration procedure is developed for calibrating strain-gage installations on aircraft structures which permits the measurement in flight of the shear, bending moment and torque. Diagrams, graphs, tables. 12 ref. (Q25)

877-Q. (English.) **Effect of Welding When Superposed Upon Prestrained Steel.** Yoshio Ando, Isao Yamaguchi, Kunihiro Iida and Yasuho Imai. *Institute of Industrial Science, Report, (University of Tokyo),* v. 4, no. 7, Mar. 1955, p. 283-313.

Results of various tensile, bending, fatigue, corrosion and notch brittleness tests in the investigation of this problem. Photographs, graphs, micrographs, diagrams, tables. (Q general, K9, R11, ST)

878-Q. (French.) **Disorganization and Cold Restoration of Aluminum Crystals Subjected to Weak Tensions.** Jules Caisso and Raymond Jacquesson. *Comptes rendus,* v. 241, no. 1, July 4, 1955, p. 50-52.

Changes brought about by tension in the texture of an aluminum monocrystal. 3 ref. (Q24, Al)

879-Q. (French.) **Investigation of the Main Defects Liable to Occur During Condenser Copper-Nickel Tube Manufacture.** Jean R. Maréchal. *Revue de métallurgie,* v. 52, no. 7, July 1955, p. 537-552.

Considers causes of lamination to be from defective heat and ingot pouring, while cracks form in the piercing operation. Tables, graphs, photographs, micrographs.
(Q26, S21, Cu, Ni)

880-Q. (French.) **Comparative Physical Properties of Low and High Nickel Bearing Steels.** R. Cazaud. *Revue de métallurgie,* v. 52, no. 7, July 1955, p. 579-582; disc., p. 583-585.

For identical tensile strengths, low nickel-bearing steels are capable of endurance strengths at least equal, if not superior, to those offered by steels with heavier nickel contents. Resistance to fatigue tests with notched specimens are in the same range. Tables, graphs.
(Q7, Q23, AY)

881-Q. (French.) **Mechanism of Brittle Fractures.** T. S. Robertson. *Revue de la soudure (Brussels),* v. 11, no. 2, 1955, p. 85-90.

Experimental investigation of the influence of grain size on the brittle fracture of carbon-0.16, manganese-0.60 and carbon-0.16, manganese-1.7 steels. Tables, graphs.
(Q26, Q23, ST)

882-Q. (German.) **Sliding Wear, Rinsing Wear, and Blasting Wear Under the Influence of Granular Solids.** Karl Wellinger and Herbert Uetz. *Forschung auf dem Gebiete des Ingeniuerwesens,* v. 21, Ausgabe B, *VDI-Forschungsheft* 449, 1955, 40 p.

Results of tests on a large quantity of flat and tubular test specimens, from various materials such as steel in various grades, chill casting, cast basalt and rubberlike substances, tested for wear resistance against limestone, glass, coke dust, flint, river sand, quartz, garnet, corundum, silicon carbide and casting shots of various hardness values. Tables, diagrams, photographs, graphs. 40 ref.
(Q9, Q29, ST)

883-Q. (German.) **Stress Tolerances of Pressure-Cast Zinc Parts.** G. Lieby. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 658-661.

Corrosive effects of the atmosphere, acids, alkalies, foods, benzene; methods of applying protective films; effect of temperature on strength properties; mechanical properties and wear resistance of zinc and zinc alloys. Photograph, graphs, diagrams. 4 ref.
(Q general, R1, Zn)

884-Q. (German.) **The Problem of Standardizing Spherical Cast Iron and the Relations Between the Mechanical Properties and the Structures of Ductile Cast Iron.** C. Pensotti and E. Mortara. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 7, July 1955, p. 235-237.

Proposed methods of standardizing malleable iron on the basis of structure and mechanical properties. Diagrams, table, graphs. (Q general, S22, M general, CI)

885-Q. (German.) **The Significance of the Relationship Between Vickers Hardness and Load.** August Braun. *Zeitschrift für Metallkunde,* v. 46, no. 7, July 1955, p. 499-503.

Elastic resilience, problem and form of load dependence. Graphs, diagrams, tables. 2 ref. (Q29)

886-Q. (Italian.) **Ultrasonic Investigation on Solid State at High Temperatures.** Piero Giorgio Bordoni. *Ricerca scientifica,* v. 25, no. 4, Apr. 1955, p. 847-859.

Elastic and anelastic behavior of metals near their melting point. The dissipation of elastic energy, when it is not affected by any relaxation phenomena, increases with temperature, and a close connection was found between this increase and creep. Graphs. 18 ref. (Q21, Q3)

887-Q. (Russian.) **Process of Metal Destruction During Creep.** I. A. Oding and V. S. Ivanova. *Doklady Akademii Nauk SSSR,* v. 103, no. 1, July 1, 1955, p. 77-80.

A new interpretation of the process which begins from diffusion of intergranular spaces into "colonies", or micropores, transformation of micropores into microfissures and continuous growth of microfissures resulting in cracks. Diagram. 10 ref. (Q3, Ni)

888-Q. (Russian.) **Application of Radioactive Indicators for Evaluating the Wear of Piston Rings.** P. E. D'iachenko and A. I. Nisnevich. *Vestnik Mashinostroeniia,* v. 35, no. 7, July 1955, p. 19-22.

Determination of dependence of wear on effective pressure and effective power of the engine by radioactive tracers. Diagrams, tables, graphs. 6 ref. (Q9, S19)

889-Q. Photoelastic Investigation in Connection With the Fatigue Strength of Bolted Joints. H. T. Jessop, C. Snell, and G. S. Holister. *Aeronautical Quarterly,* v. 6, Aug. 1955, p. 230-239.

Elastic stress distribution around a circular hole in a flat bar under simple tension, when the hole is filled by a push-fit pin, investigated photo-elastically. Over a range of values of the ratio hole diameter to width of bar, and for pins of differing Young's moduli, the effect of the pin was sensibly the same, namely, to reduce the maximum tension on the hole boundary by about 15% as compared with that in the unfilled hole. Photograph, graphs. 2 ref. (Q7, Q25, Q21)

890-Q. Study of Brittle Failure in Tank Steels. F. J. Feely, Jr., and M. S. Northup. *American Petroleum Institute, Proceedings,* sec. III. *Refining,* v. 34, 1954, p. 168-179; disc., p. 179-185.

Development of a test to simulate conditions at the time of a tank failure. Efforts to obtain a correlation between test results and fundamental physical properties of the materials tested. Photograph, graphs, diagrams, tables. (Q26, Q23, ST)

891-Q. Selection of Materials for a Sodium Graphite Reactor System. C. C. Woolsey, Jr. *American Society of Mechanical Engineers, Paper No.* 55—S-16, 1955, 5 p. + 1 plate.

High - temperature mechanical properties of zirconium alloys and stainless steels. Selection criteria include compatibility with other materials in the system, and also their parasitic neutron absorption. Photograph, tables. (Q general, Zr, SS)

892-Q. Tensile Properties of Sheet Zirconium at Room and Elevated Temperatures. A. D. Schwope, S. J. Stockett and G. T. Muehlenkamp. *Battelle Memorial Institute (U. S. Atomic Energy Commission),* BMI-T-39, Oct. 1950, 27 p.

Data obtained from a series of tests made on low-hafnium, arc-melted zirconium crystal bar from 70 to 600° F. Tensile strength drops from 38,000 to 17,000 psi. at 600° F.; the "n" value suggests 400° F. or higher for best forming work. Tables, graphs. (Q27, Zr)

893-Q. Weldability and Mechanical Properties of Two Low-Alloy Steels in the Hardened and Tempered Condition. B. J. Bradstreet. *British Welding Journal,* v. 2, Aug. 1955, p. 347-350.

Results of weldability, tensile and impact tests on 1½ in. low alloy steel plate to determine resistance to hard-zone cracking. Tables, graphs, diagram. 3 ref. (Q general, K9, AY)

894-Q. Impurities in Titanium: Sulphur. D. A. Sutcliffe. *Gt. Brit. Royal Aircraft Establishment, Technical Note* MET. 218, Mar. 1955, 12 p.

Approximately 0.1% sulfur causes a marked rise in tensile strength and hardness with a corresponding fall in elongation and impact strength. More sulfur (up to 1.05%) is deleterious. Tables, graphs, micrographs. 10 ref.
(Q23, Q27, Q29, Q6, Ti, S)

895-Q. Yield Behaviour of Metals at Low Temperatures. H. F. Hall and R. W. Nichols. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 329-336 + 2 plates.

Carbon steels, low-alloy steels and two nonferrous alloys studied from +200 to −197° C. Tables, graphs, diagrams. 18 ref.
(Q23, CN, AY, Cu, Al)

896-Q. The Errors Introduced Into Diamond Pyramid Hardness Testing by Tilting the Specimen. T. O. Mulhearn and L. E. Samuels. *Iron and Steel Institute, Journal,* v. 180, Aug. 1955, p. 354-358 + 1 plate.

Errors from vertical and horizontal rotation evaluated. Table, graphs, diagram, micrographs. 2 ref. (Q29)

897-Q. Rupture of Heat-Resistant Alloys in Flame Gas Atmospheres. Edward W. LaRocca. *Jet Propulsion,* v. 25, Aug. 1955, p. 396-399.

Rupture of temperature-resistant materials, stressed in combustion atmospheres, reported for two cold-worked commercial alloys at temperatures between 920 and 1150° C. in a burning propane flame. Graphs, tables, micrographs. 17 ref.
(Q4, SG-h)

898-Q. Compression of the Alkali Metals to 10,000 Atmospheres at Low Temperature. C. A. Swenson. *Physical Review,* v. 99, ser. 2, July 15, 1955, p. 423-430.

Determinations at 4.2 and 77° K. The unusual features found were an abnormally low decrease in compressibility with pressure for cesium, probably connected with a smearing out of the electronic transition found at 45,000 atmospheres at room temperature, and a possible transformation in rubidium at 77° K. which resulted in a permanent increase in the room-temperature density of about 10%. Diagrams, graphs, tables. 21 ref.
(Q28, EG-e-41)

899-Q. Some Properties of Various Binary Molybdenum-Base Alloys. Egon Pipitz and Richard Kieffer. *Powder Metallurgy Bulletin,* v. 7, Aug. 1955, p. 53-59.

Indications that the addition of certain alloying elements affects strongly some of the physical properties of molybdenum such as the recrystallization temperature, toughness, ductility, room temperature hardness and hot hardness. Table, graphs. 9 ref. (Q general, Mo)

900-Q. Some Problems Associated With Stress Concentration. H. L. Cox. *Royal Aeronautical Society, Journal,* v. 59, Aug. 1955, p. 551-561.

Cases of stress and load concentration, investigations of special two-dimensional boundaries with general theoretical conclusions which can be drawn, review of possible reasons why, in practice, the best found conclusions are not always borne out. Graphs, photographs, diagrams. (Q25)

901-Q. Tension-Impact Properties of Austenitic Stainless Steels at Ambient and Low Temperatures. A. Choquet, V. N. Krivobok and G. Welter. *Welding Journal,* v. 34, Aug. 1955, p. 361S-373S.

Static and dynamic properties of several stainless steels determined for base metal and butt welded assemblies. Diagrams, photographs, tables, micrographs, graphs. 3 ref.
(Q27, Q6, SS)

902-Q. Modified Navy Tear Test for Measuring the Work of Fracture Propagation in Ductile Metals. Hugh E. Romine. *Welding Journal,* v. 34, Aug. 1955, p. 396S-408S.

Test and application to the study of fracture properties of mild steel plate, ¼-in. thick. Tables, micrographs, photographs, diagrams, graphs. 7 ref. (Q26, ST)

903-Q. Internal Friction of Steel and Temper Brittleness. E. I. Kvashnina and V. I. Prosvirin. *Henry Brutcher Translation No.* 3555, 6 p. (From *Izvestiya Akademii Nauk SSSR,* 1955, no. 1, Jan., p. 157-159.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 609-Q, 1955.
(Q22, Q23, ST, Mo, Cr, Mn)

904-Q. (English.) **Nomenclature of Strain Parameters.** A. D. Fokker. *Physica,* v. 21, no. 7, July 1955, p. 575-578.

Defines one, two and three-dimensional strain parameters and shows how to find the parameters from the particle displacements. (Q25)

905-Q. (German.) **Graphic Method of X-Ray Measurement of Deformation.** Günter Kemmnitz. *Archiv für das Eisenhuttenwesen,* v. 26, no. 8, Aug. 1955, p. 437-443.

Theoretical basis of the method, technique of operation, application in case of deformation under uniaxial and biaxial stress. Diagrams, tables. 8 ref. (Q24)

906-Q. (German.) **Possibility of Industrial Application of X-Ray Stress Determination.** Alfred Schaal. *Archiv für das Eisenhuttenwesen,* v. 26, no. 8, Aug. 1955, p. 445-447.

Analysis of X-ray diffraction pattern for the determination of residual stresses (tensile and compression). Industrial application. Photography, graphs, diagrams. 9 ref. (Q25, M22)

907-Q. (German.) **Comparison of Deformation of Cast Iron Determined by X-Ray Diffraction and Mechanical Methods.** Viktor Hauk. *Archiv für das Eisenhüttenwesen,* v. 26, no. 8, Aug. 1955, p. 449-453.

Method of investigation, practical results, demonstration of the behavior of different sizes and shapes of graphite in gray cast iron under various stresses. Micrographs, tables, graphs. 12 ref. (Q24, M22, CI)

908-Q. (German.) **Behavior of Surface Layer and Elastic Constants of Steel With 0.43% C Established by X-Ray Diffraction Stress Determination.** Hans Hendus and Christian Wagner. *Archiv für das Eisenhüttenwesen,* v. 26, no. 8, Aug. 1955, p. 455-461.

X-ray diffraction determination of residual stress development in steels with 0.16, 0.43 and 0.76% C. Technique of determination. Micrographs, tables, diagrams, graphs. 24 ref. (Q25, M22, ST)

909-Q. (German.) **Changes in Crystal Structure of Chromium-Nickel-Molybdenum Steels During Long-Time Creep Test Under Load at 500 C.** Franz Wever, Alfred Krisch and Hans-Joachim Wiester. *Archiv für das Eisenhüttenwesen,* v. 26, no. 8, Aug. 1955, p. 463-474.

Sixteen-thousand-hour creep testing of five low-alloy steels differently heat treated. Relation between carbide phase and creep behavior. Tables, graphs, micrographs. 29 ref. (Q3, AY)

910-Q. (German.) **Electron Microscopic Investigation of Crystal Structure Changes of Chromium-Nickel-Molybdenum Steels Under Long-Time Tensile Stress at 500° C.** Franz Wever and Angelica Schrader. *Archiv für das Eisenhüttenwesen,* v. 26, no. 8, Aug. 1955, p. 475-481.

Composition of steels, heat treatment, method of investigation, analysis of results. Table, micrographs. 12 ref. (Q3, M26, AY)

911-Q. (German.) **Testing the Creep-Stress Resistance of Boiler Metals in the Acceptance of Materials.** K. Wellinger and E. Keil. *Brennstoff-Wärme-Kraft,* v. 7, no. 8, Aug. 1955, p. 354-356.

Short-time experiments at operating temperatures to determine validity of standard creep tests and effect of previous annealing on creep strength of boiler steels. Graphs, micrographs. 3 ref. (Q3, ST)

912-Q. (Japanese.) **Some Problems on Nip Stresses (Stress Distribution, Caused by Nipping, in the Leaves of a Spring).** Katsunobu Tomita, Shinichi Watanabe and Takeshi Hirai. *Journal of Railway Engineering Research (Japan),* v. 12, no. 9, May 10, 1955, p. 199-215.

Experiments to determine measures for prevention of fatigue deformation. Graphs, tables, diagrams. 14 ref. (Q25, Q24, CN)

913-Q. (Japanese.) **Dynamical Strength of Railway Track.** Yutaka Sato. *Journal of Railway Engineering Research (Japan),* v. 12, nos. 10-11, June 10, 1955, p. 225-278.

Examination of the dynamical property of railway track, to find its destruction mechanism, and the key point for its strengthening. Tables, graphs, diagrams, photographs. 42 ref. (Q23)

914-Q. (Japanese.) **Steel-Core Cast Iron: Special Qualities, Method of Manufacture, and Specifications.** Taichiro Usui. *Metals (Japanese),* v. 25, no. 8, Aug. 1955, p. 585-589.

Three types of linking zone between steel core and cast iron. Microstructure and mechanical properties including strength and hardness. Tables, graphs, micrographs. 6 ref. (Q general, M27, CI)

915-Q. (Norwegian.) **Measuring With Strain Gages. Process and Accuracy.** Strekklappmalinger. Just Fr. Storm. *Teknisk Ukeblad,* v. 102, no. 28, Aug. Just Fr. Storm. *Teknisk Ukeblad,* v. 102, no. 28, Aug. 11, 1955, p. 593-602.

Different types of strain gages and uses on different surfaces; computation of stresses. Diagrams, photographs, graphs. 6 ref. (Q25)

916-Q. (Russian.) **Phosphorus in Magnesium Cast Iron.** K. I. Vashchenko and L. Sofroni. *Liteinoe Proizvodstvo,* 1955, no. 7, July, p. 12-17.

Influence of phosphorus on mechanical properties, crystal struc-

ture, solidification properties and shrinkage. Tables, graphs, micrographs. 7 ref.
(Q general, M26, E25, CI)

917-Q. The Fatigue of Metals. Philip Thornton. *Discovery,* v. 16, Sept. 1955, p. 374-376.

Explanation of fluctuating loads as a possible cause of brittle fracture and the effect of inclusions on discontinuity in the metal structure. Photograph, diagram, micrograph. 5 ref. (Q7)

918-Q. Loosening and Fatigue Strength of Bolted Joints. M. Boomsma. *Engineer,* v. 200, Aug. 26, 1955, p. 284-286.

Surveys and comments upon existing knowledge about the loosening of bolted joints under variable tension loads; effect of bolt length and diameter on loosening; fatigue strength of bolted joints with comparatively rigid abutments. Graphs, diagrams, tables. 12 ref. (Q7)

919-Q. The Use of Radio-Active Isotopes in the Study of Wear of Machine Parts. B. D. Grozin. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/-P/713, June 1955, 21 p. (Translated from the Russian.)

Advantages include high sensitivity, simultaneous establishment of wear during work without disassembling the machines, automatic recording of wear processes, application of radiography in studying metal-transfer and diffusion. Graphs, micrographs, diagrams, tables.
(Q9, N1, S19)

920-Q. Simple Equipment Opens Research Door. Richard A. Flinn and Paul K. Trojan. *Modern Castings and American Foundryman,* v. 28, Sept. 1955, p. 62-65.

Development of a method for the metallographic observation of a specimen under stress. Microscope, microbend tester and polished metal strip combine to give new tool for studying flow and fracture of metals. Diagrams, photographs, micrographs. (Q5, Q24, Q26, M27)

921-Q. (English.) **A Study of Primary and Conjugate Slip in Crystals of Alpha-Brass.** G. R. Piercy, R. W. Cahn and A. H. Cottrell. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 331-338.

Overshooting in alpha-brass crystals as a result of the difficulty which slip on the conjugate system experiences in cutting through the active primary slip lines. Graphs, diagrams, micrographs, photographs. 26 ref. (Q24, Cu)

922-Q. (English.) **A Theory of Fracture and Fatigue.** N. F. Mott. *Physical Society of Japan, Journal,* v. 10, no. 8, Aug. 1955, p. 650-656.

Concept of a piled-up group of dislocations and its relation to ductile and brittle-fracture and fatigue. Diagrams. 14 ref. (Q26, Q7)

923-Q. (French.) **Elastic Modulus and Internal Friction of Polygonized Aluminum.** J. Friedel, C. Boulanger and C. Crussard. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 380-391.

Observation in polygonized coarse-grained aluminum, at elevated temperature, of strong drop of Young's modulus while the internal friction reaches high values. Table, photographs, graphs, diagrams. 29 ref. (Q21, Q22, Al)

924-Q. (German.) **The Ideal Orientations of a Rolling Texture.** Johanna Grewen and G. Wassermann. *Acta Metallurgica,* v. 3, no. 4, July 1955, p. 354-360.

Comparative study of the rolling texture of aluminum foil by the texture goniometer. Investigation was made as to the manner in which this variation affects the interpretation of the texture by means of ideal orientations. Graphs, diagrams, table. 13 ref. (Q24, Al)

925-Q. (German.) **Effect of Heat-Treatment on the Strength and Notch Toughness of Hot-Working Tool Steels.** Karl Bungardt, Gustav Hoch and Otto Mülders. *Stahl und Eisen,* v. 75, no. 16, Aug. 11, 1955, p. 1035-1046.

Establishes mathematical formulas for the dependency on time and temperature of changes in the properties governed by diffusion, effect of austempered structure on the stability of temper and notch toughness, improvement of notch toughness by double or multiple tempering. Table, graphs. 10 ref.
(Q23, J29, N1, TS)

926-Q. (German.) **The Problem of the Stress Limit of Hard Metals.** J. Hinnüber. *Technische Mitteilungen Krupp,* v. 13, no. 3, July 1955, p. 66-68.

Strength of hard metal and cemented carbide cutting tools at machining temperatures. Graphs, photograph, micrographs. 2 ref.
(Q23, G17, EG-d, C-n)

927-Q. (German.) **Magnetic Investigations on the Orientation and Amplitude Distribution of Internal Stresses in Plastically Expanded Metals.** Ludwig Reimer. *Zeitschrift für angewandte Physik,* v. 7, no. 7, July 1955, p. 332-336.

Measurement of remanence and remanence change on cube-shaped specimens of nickel and iron deformed by tensile and compression stresses indicate that the main-stress direction deviates by no more than 10° from the direction of applied stress. Table, graphs, diagrams. 13 ref. (Q25, P16, Fe, Ni)

928-Q. (Polish.) **Measurement of the Moment of Friction in the Bearings of Precision Instruments.** Roman Calikowski. *Technika lotnicza*, v. 10, no. 4, July-Aug. 1955, p. 98-103.

Friction meter and formulas for calculating moment of friction in the bearings of aircraft instruments and magnetic compass. Table, diagrams, graph. 8 ref. (Q9)

929-Q. (Russian.) **Strength and Plastic Properties of Complexly Alloyed Construction Steel.** M. P. Braun and E. E. Maistrenko. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk*, 1955, no. 6, June, p. 119-126.

Chemical compositions of the steels, comparison of mechanical characteristics of steels, after quenching and high-temperature tempering, effect of tempering temperatures on mechanical properties. Tables, graphs. 2 ref. (Q general, P13, AY)

930-Q. (Russian.) **Physical Bases of the Strength of Materials.** S. T. Konobeevskii. *Vestnik Akademii Nauk SSSR*, v. 25, no. 7, July 1955, p. 15-22.

Theoretical background and present concepts; dislocations in single metallic crystals; elastic and plastic deformation of different orders; diffusion mechanism of plasticity. (Q general, M26)

931-Q. (Russian.) **Method of Determining the Residual Stresses in Butt Welded Joints of Tubes Made of Steel With Different Coefficient of Thermal Expansion.** A. S. Gel'man and V. S. Popov. *Zavodskaia Laboratoriia*, v. 21, no. 6, June 1955, p. 722-724.

Description of the method, influence of heat treatment, after welding, on determination. Diagrams, tables. 1 ref. (Q25, P11, ST)

932-Q. (Russian.) **Methods of Determining the Microhardness of the Working Surface of the Cylinder of an Internal Combustion Machine.** M. M. Khrushchov, E. S. Berkovich, M. D. Krashchin, K. A. Krylov and A. V. Andreeva. *Zavodskaia Laboratoriia*, v. 21, no. 7, July 1955, p. 844-947.

New testing devices and their use. Chrome plated and other surfaces were tested. Photographs, micrograph. (Q29)

933-Q. (Russian.) **Influence of the Deformation Rate on the Mechanical Characteristics of Steel Obtained by Tensile Testing.** F. F. Pedanov. *Zavodskaia Laboratoriia*, v. 21, no. 7, July 1955, p. 847-849.

Effects of strain rate on results of tensile tests. Graphs, table. (Q27, ST)

934-Q. (Book.) **Bibliography on the Fatigue of Materials, Components and Structures.** J. Y. Mann, compiler. v. I. 1843-1938. 288 p. 1954. Commonwealth of Australia, Department of Supply, Research & Development Branch, Aeronautical Research Laboratories, Melbourne, Australia.

Entries are listed for each year. (Q7)

935-Q. (Book.) **Bibliography on Residual Stress.** T. C. Huang. 196 p. 1954. Society of Automotive Engineers, 29 West 39th Street, New York 18, N. Y.

Measurement, occurrence, control, removal, and effects of residual stresses. (Q25)

936-Q. (Book.) **Studies in the Behavior of Certain Nonferrous Metals at Low Temperatures.** PB 111657.

Final Report, v. I. 157 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $4.00.

Use of tantalum at temperatures down to −100° F. without impairment of its mechanical properties. Effect of modulus of elasticity and grain size on the low-temperature properties of copper and silver. (Q general, Cu, Ag, Ta)

937-Q. Physical Characteristics of Titanium Carbide Type Cermets at Elevated Temperatures. F. P. Knudsen, R. E. Moreland and R. F. Geller. *American Ceramic Society, Journal*, v. 38, Sept. 1955, p. 312-323.

Shows creep behavior and strength at 1200 to 1850° F. for cermets to be used in the high-temperature areas of aircraft. Cermet K162B was superior. Diagrams, tables, photographs, micrographs, graphs. 10 ref. (Q3, Q4, C-n)

938-Q. Stress Analysis Takes Guesswork Out of Product Performance. W. G. Patton. *Iron Age*, v. 176, Sept. 15, 1955, p. 131-134.

Stress analysis is being used by Ford Tractor Div. to help improve farm implement design. Photographs, graph. (Q25, ST)

939-Q. The Elastic-Plastic Stress Distribution Within a Wide Curved Bar Subjected to Pure Bending. Ber-

nard W. Shaffer and Raymond N. House, Jr. *Journal of Applied Mechanics,* v. 22, Sept. 1955, p. 305-310.

Analytical expressions obtained for radial and circumferential stress. Elastic stress distributions are based on Airy stress functions, whereas those for plastic are based on the Tresca yield condition. Graphs. (Q22, Q23, Q5)

940-Q. Thermal Stresses in Rectangular Strips. II. J. S. Born and G. Horvay. *Journal of Applied Mechanics,* v. 22, Sept. 1955, p. 401-406.

Stresses and deformations due to various longitudinal temperature distributions are presented, the results of which are important to slabs, plate assemblies, rectangular ducts, tube-sheet ligaments and cylindrical bodies. Diagrams, tables, graphs. 2 ref. (Q25)

941-Q. Combined Tension-Torsion Tests With Fixed Principal Directions. E. A. Davis. *Journal of Applied Mechanics,* v. 22, Sept. 1955, p. 411-415.

Octahedral shearing-stress versus octahedral shearing-strain diagrams for four specimens coincide quite closely. Photographs, graphs, table. 7 ref. (Q27)

942-Q. The Statistical Theory of Size and Shape Effects in Fatigue. F. A. McClintock. *Journal of Applied Mechanics,* v. 22, Sept. 1955, p. 421-426.

Stress amplitude is constant with respect to time but falls off parabolically along length of specimen from point of maximum stress. Graphs, diagrams. 7 ref. (Q7)

943-Q. Further Observations on Yield in Single Crystals of Iron. H. W. Paxton and I. J. Bear. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 989-994.

Yield in two stages of which the second corresponds closely to Lüders extension in polycrystalline iron. Graphs, tables, diagrams, photographs. 20 ref. (Q23, Fe)

944-Q. Bauschinger Effect in Creep and Tensile Tests on Copper. J. D. Lubahn. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1031-1033.

This rounding of corner of stress-strain curve upon reloading represents temporary softness that is more pronounced at large strains than small and for complete unloading than for partial unloading. Graphs. 4 ref. (Q24, Q3, Cu)

945-Q. The Selection of Sheet Steel for Formability. *Metal Progress,* v. 68, Aug. 15, 1955, p. 1-11.

Selection of cold and hot rolled low-carbon steels. Mechanical properties correlated from viewpoint of the measurable formability required to make parts of specific forming severity. Surface finish, directionality, grain size and aging, and processing effects are considered with respect to their effect on formability. Tables, photographs, graphs. (Q23, G4, ST)

946-Q. Recent Developments in Chromium Diffusion. II. Influence on Properties of Steel. R. L. Samuel, N. A. Lockington and H. Dorner. *Metal Treatment and Drop Forging,* v. 22, July 1955, p. 288-292, 287.

Effects on hardness, ductility, tensile and other mechanical properties. Tables, graph, photograph, micrographs. (To be continued.) (Q23, Q27, Q29, N1, ST)

947-Q. Investigation on the Strength of Redux Bonded 75S-T6 Clad Simple Lap Joints and of 24S-T Lugs at Rapidly Applied Loads. J. P. Benthem and G. de Vries. *Netherlands National Luchtvaartlaboratorium Report* S.466, June 1955, 5 p. + 12 plates.

Neither drop nor increase in strength of either joints or lugs could be detected. Diagrams, graphs, photographs. (Q23, K12, Al)

948-Q. The Bending Fatigue Strength of Aluminium Alloy MG_5 Between 10 and 10 Million Cycles. A. C. Low. *Royal Aeronautical Society, Journal,* v. 59, July 1955, p. 502-506.

Test results do not conform with predictions of cumulative damage theory. Photographs, tables, graphs, diagram. (Q7, Q5, Al)

949-Q. A Method for Tensile Testing of Radioactive Materials. C. A. Bruch. Paper from "Fourth Annual Symposium on Hot Laboratories and Equipment". TID-5280. Office of Technical Services, U. S. Department of Commerce, p. 277-286.

Two separable strain gages are used in succession to obtain recordings of the load-elongation curve. The first gage provides high magnification of the low strain region, the second gives low magnification of the subsequent strain to fracture. Diagrams, photographs, graphs. (Q27)

950-Q. Effects of Impurities and Imperfections on Mechanical Properties. Earl R. Parker and Jack Washburn. Paper from "Impurities and Imperfections". American Society for Metals, p. 145-161.

Experiments were undertaken to better understand yield, work hardening and creep; and to apply knowledge to improve commercial material. Graphs, diagrams. 14 ref. (Q general, M26)

951-Q. Structure Dependent Chemistry of Metal Surfaces. W. D. Robertson. Paper from "Impurities and Imperfections". American Society for Metals, p. 170-185.

Considers imperfections associated with growth history and described by differences between adjacent crystals and imperfections resulting from plastic deformation. Graphs, micrographs. 15 ref. (Q24, M26)

952-Q. Control and Programming of a 200,000-Pound Fatigue Machine. H. C. Roberts and V. J. McDonald. *Proceedings,* Society for Experimental Stress Analysis, v. II, No. 2, p. 1-10.

System is applied to lever-type machines because of their ruggedness and simplicity. Three types of programming devices have been applied but many more hold promise. Diagrams, photographs. 4 ref. (Q7)

953-Q. Simplified Measurement of Residual Stresses. J. L. Waisman and A. Phillips. *Proceedings,* Society for Experimental Stress Analysis, v. II, No. 2, p. 29-44.

Technique for measuring the residual stress gradient developed in plates involves the removal, by chemical solution, of layers from one surface of a specimen containing residual stresses and the simultaneous measurement of curvature changes accompanying the removals. Measuring fixture is described. Diagrams, graphs, photograph. (Q25)

954-Q. Network Representation of Elastic Problems in Cylindrical Coordinates. W. A. Gross and W. W. Soroka. *Proceedings,* Society for Experimental Stress Analysis, v. II, No. 2, p. 45-58.

Relations between the electrical circuit and the corresponding lumped elastic system of a three-dimensional problem in cylindrical coordinates shown in detail. The difficulty of simulating boundary stresses besetting previous developments has been resolved. Diagrams, tables. 8 ref. (Q21)

955-Q. Experimental Stress Determination Within a Metal During Plastic Flow. E. G. Thomsen and J. T. Lapsley, Jr. *Proceedings,* Society for Experimental Stress Analysis, v. II, No. 2, p. 59-68.

An experimental strain analysis for a non-work hardening metal from a stepwise deformation process. The stress distribution may be calculated for the case where the load at a particular section of the metal is known and for the more general case where only the hydrostatic tension is known at one point in the metal. Photograph, diagrams, graphs. 2 ref. (Q23, Q25)

956-Q. Improved Brittle Coatings for Use Under Widely Varying Temperature Conditions. F. N. Singdale. Paper from *Proceedings,* Society for Experimental Stress Analysis, v. II, No. 2, p. 173-178.

Oil and water resistant vitreous enamels for stress analysis in steel are sensitive to stresses from 4000 to 50,000 psi. Enamels for aluminum are being developed. Photographs. (Q25, Al, ST)

957-Q. Stress Concentration Factors For a Single Notch in a Flat Bar in Pure and Central Bending. M. M. Leven and M. M. Frocht. *Proceedings,* Society for Experimental Stress Analysis, v. 11, No. 2, p. 179-184.

Investigated photo-elastically for flat bars. The maximum stress in the bars with the single notch is about 15% higher than that in the bar containing two notches, for equal parameters and similar loading. Graphs, photographs. 6 ref. (Q25)

958-Q. Relation Between Stress Analysis and Fatigue of Metals. R. E. Peterson. *Proceedings,* Society for Experimental Stress Analysis, v. 11, No. 2, p. 199-206.

Stress distribution in metal parts has great influence on fatigue performance. Photographs, graphs. 11 ref. (Q7, Q25)

959-Q. Interpretation of Creep and Long-Time Test Data. J. Martin. *Proceedings,* Society for Experimental Stress Analysis, v. 11, No. 2, p. 207-212.

Application of creep behavior studies. Graphs, tables. 8 ref. (Q3)

960-Q. Transformation and Precipitation Processes in Austenitic Chromium-Nickel Steels at Elevated Temperatures. E. Baerlecken and W. Hirsch. *Henry Brutcher Translation No.* 3453, 28 p. (From *Stahl und Eisen,* v. 75, no. 9, 1955, p. 570-579.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 602-Q, 1955. (Q general, R5, SS)

961-Q. Effect of Cracks Upon the Mechanical Properties of Metals in Different States of Stress. Ya. B. Fridman, T. K. Zilova and N. I. Zhukova. *Henry Brutcher Transla-*

tion No. 3542, 5 p. (From *Doklady Akademii Nauk SSSR,* v. 84, no. 1, 1952, p. 67-70.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 727-Q, 1952. (Q25)

962-Q. (English.) **Tests on Steel Pylons for Overhead Power Lines.** P. Fayoux. *Acier, Stahl, Steel,* v. 20, nos. 7-8, July-Aug. 1955, p. 291-298.

Compares influence of shape and arrangement of lattice framework to determine influence of wind bracing and to check failure loads for a large number of pylons. Diagrams, photographs. (Q23, T1, ST)

963-Q. (English.) **The Creep Properties of Aluminium Alloys With Reference to Future Uses of Aluminium at Elevated Temperatures.** David E. Thomas. Paper from "Congres International de l'Aluminum". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 275-281.

Review of the existing information about creep properties; discusses to what extent this information is likely to be adequate to meet the demands which might be made in connection with future trends in applications involving the use of aluminum alloys at elevated temperatures. Graphs, tables. 18 ref. (Q3, Al)

964-Q. (Czech.) **Stability of Long Plates Under Shear Stress.** V. Placak. *Strojirenstvi,* v. 5, no. 5, May 1955, p. 325-329.

Existing methods of calculating the properties of various test structures for stages of deformation, stressed states and buckling or warping. State of the bar, equilibrium conditions, critical stresses and size of load. Photographs, diagrams. (Q2, Q25, ST)

965-Q. (French.) **Installation for Testing Hot Fatigue in Wave Thrust in Petroleum Combustion Gases.** G. Vidal. *Recherche Aéronautique,* 1955, no. 46, July-Aug., p. 25-29.

Apparatus for hot fatigue tests for reducing, oxidizing and alternating reducing and oxidizing types of combustion, and for impurities dissolved in petroleum, in any controlled atmosphere at normal atmospheric pressure. Diagrams, micrographs, photographs, table. 5 ref. (Q7)

966-Q. (French.) **Contribution to the Study of the Ductility and Toughness of Gray Cast Irons.** Albert Collaud. *von Roll Mitteilungen,* v. 13, nos. 3-4, July-Dec. 1954, p. 25-74.

Tests carried out with machined specimens require distinctly different treatment and formulas for accurate evaluation. Ductility and Brinell hardness are related. Tables, graphs, micrographs. (Q23, Q29, CI)

967-Q. (French.) **Study of the Quenching of a Light Alloy With Reference to Its Elastic Properties.** Robert Cabarat. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 271-273; disc., p. 273.

Method of measuring the modulus of elasticity and internal friction. In an application of this method, the author shows the effects of quenching—against time—on an aluminum-zinc alloy, with reference to its elastic properties. Diagram, graph, photograph. (Q21, Q22, J26, Al, Zn)

968-Q. (French.) **Rolling and Recrystallization Textures of Aluminum Plates.** Wolfgang Bunk. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 231-236.

Specimens of industrial hot rolled aluminum, subjected to different amounts of cold work and heat treatments examined with an X-ray goniometer; detailed description of the textures. Graphs. 8 ref. (Q24, Al)

969-Q. (German.) **Orientation of Crystal Structure in Galvanized Steel Wire After Drawing.** Wolfgang Gruhl and Irmgard Eisenhuth. *Stahl und Eisen,* v. 75, no. 17, Aug. 25, 1955, p. 1100-1101.

Determination of the preferred crystallographic orientation in the zinc coat of a galvanized and subsequently cold drawn steel wire. Graph, diagrams. 2 ref. (Q24, ST, Zn)

970-Q. (German.) **Creep Behavior of Pure and Low Alloyed Copper.** Hugo Vosskühler. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 525-534.

Evaluation of existing bibliographical data on time-elongation limit (time yield), creep rate limit and long-time creep resistance. Tables, graphs. 14 ref. (Q3, Cu)

971-Q. (German.) **Solubility of Oxygen in Tantalum and Related Changes in Tantalum Properties.** Erich Gebhardt and Hans Preisendanz. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 560-568.

Development of method at very high temperatures and very low pressures, to show the influence of

oxygen on damping, nodulus of elasticity, magnetic susceptibility, hardness, tensile strength, elongation, necking, and chemical behavior of tantalum. Graphs, diagram, photograph. 37 ref.
(Q general, P13, Ta)

972-Q. (German.) **Irreversible Elongation of Zinc Under Thermal Stress.** Kurt Claus and Karl Löhberg. *Zeitschrift für Metallukunde,* v. 46, no. 8, Aug. 1955, p. 582-588.

Cnanges in elongation during liquation processes, recrystallization and grain growth; changes in coefficient of expansion, elasticity modulus, and structure due to thermal stress. Graphs, diagrams, micrographs. 9 ref.
(Q23, Q25, N5, N3, Zn)

973-Q. (Russian.) **Theory of the Plastic Deformations of Metals.** N. S. Akulov and P. P. Galenko. *Doklady akademii nauk SSSR,* v. 103, no. 3, July 21, 1955, p. 387-390.

Equations for the movements in "blocks", accounting for the variation of dislocation in different portions of the crystal. Diagrams, graph. (Q24, M26)

974-Q. (Russian.) **Lithoidal Fracture in Construction Steels.** S. S. Nosyreva and A. M. Poliazova. *Doklady akademii nauk SSSR,* v. 103, no. 3, July 21, 1955, p. 431-432 + 1 plate.

Effect of amount and distribution of sulfides in forged or rolled steels after overheating and subsequent normal heat treatment. Micrographs. 3 ref. (Q26, ST)

975-Q. (Russian.) **Energy Theory of the Formation of Cracks in Cast Iron Ingot Molds.** S. F. Fomin. *Stal'* v. 15, no. 8, Aug. 1955, p. 743-747.

Theory that the influence of the individual chemical elements of cast iron on the development of cracks in molds depends on "amount of internal energy" of each element, which is characterized by its "thermochemical potential". Use of the energy theory calculations has resulted in molds lasting through twice as many pourings under actual casting conditions. Tables. 3 ref. (Q26, D9, T5, CI)

976-Q. (Russian.) **Method of Determining the Embrittlement of Steel in the Case of Blue Brittleness.** G. I. Pogodin-Alekseev. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 971-974.

Variation in impact toughness or plasticity of steel in the range of cold shortness and blue brittleness determined by impact and static testing; relation of carbon content to strength. Graphs, tables.
(Q23, ST)

977-Q. (Russian.) **Allowance for Deformation Rate When Tensile Testing Aluminum Alloy Sheets.** F. V. Tuliankin and B. D. Galatskii. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 975-979.

Relation of critical rate of deformation to tensile strength for variously heat treated specimens of aluminum alloys, and of tensile strength and relative elongation to test rate. Graphs, tables. 5 ref.
(Q27, Al)

978-Q. (Russian.) **New Machine for Fatigue Testing Thin Sheet Metal.** I. M. Roitman. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 983-985.

Testing by pure bending; machine design and operation. Diagrams.
(Q7, Q5)

979-Q. **A Practical Method of Fatigue Stress Analysis.** W. H. Burdon. *Aircraft Engineering,* v. 27, Sept. 1955, p. 299 + 6 p.

Linear relationship, existing between principal variants in material fatigue, leads to solution of analysis for light alloys under axial stresses. Theoretical notch factors used. Graphs, tables. 17 ref.
(Q7, Q25)

980-Q. **Influence of Alloying Elements on the Impact Transition Behavior of 12% Cr Steels Aged at 900° F.** E. J. Whittenberger and E. R. Rosenow. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 1, 1955, 35 p.

Effect of varying amounts of carbon, chromium, molybdenum, aluminum and titanium upon the V-notch Charpy transition temperature of 12% chromium steels aged for 10,000 hr. at 900° F. Tables, graphs, micrographs. 5 ref. (Q6, Q23, AY)

981-Q. **Creep Rupture Properties of Cold Worked Type 347 Stainless Steel.** N. J. Grant, Albert G. Bucklin and Warren Rowland. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 2, 1955, 14 p.

Cold-worked up to 60%, the recrystallization temperatures were determined for 0.5, 5, and 50-hr. intervals. In addition to tensile testing at room temperature, creep rupture tests were performed at 1200, 1300 and 1500° F. to study the effects of cold work on the high-temperature properties, and to relate the time-temperature values for the incidence of intercrystalline fracture to the static recrystallization temperature. Tables, graphs, micrographs. 4 ref. (Q3, Q4, N5, SS)

982-Q. **Notch Ductility of Type 410 (12% Cr) Stainless Steel.** F. A.

Brandt, H. F. Bishop and W. S. Pellini. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 3, 1955, 30 p.

Influence of composition and heat treatment variables on the notch ductility of cast stainless steels. Sharp crack tests of large specimens were used to establish the temperature range of transition from notch-ductile to notch-brittle behavior and correlation was established with results of conventional Charpy-V tests. Tables, graphs, diagrams, micrographs. 5 ref. (Q23, SS)

983-Q. The Influence of Stain Rate and Temperature on the Ductility of Austenitic Stainless Steel. G. W. Form and W. M. Baldwin, Jr. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 4, 1955, 14 p.

The ductility shows a maximum at room temperature at low strain rate, but at high strain rates it increases slowly and steadily with the test temperature. Magnetic measurements showed that the gamma-alpha transformation cannot account for all these behaviors. Diagrams, graphs, micrographs. 14 ref. (Q23, Q27, SS)

984-Q. The Effect of Composition and Structure on the Creep Rupture Properties of 18-8 Stainless Steels. Forest C. Monkman, Peter E. Price and Nicholas J. Grant. *American Society for Metals, Transactions*, v. 48, *Prevrint No.* 6, 1955, 34 p.

Twenty-seven simple unstabilized stainless steels were prepared in which amounts of chromium, nickel, and carbon plus nitrogen were varied. Stress-rupture tests were conducted on these alloys at temperatures of 1000, 1200 and 1300° F. for rupture lives of about 30 sec. to 500 hr. Tables, graphs, micrographs. 9 ref. (Q3, Q4, SS)

985-Q. Some Effects of Silicon on the Mechanical Properties of High Strength Steels. C. H. Shih, B. L. Averbach and Morris Cohen. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 9, 1955, 33 p.

Effects of increasing silicon content in 4340 and 4325 steels to 1.5% observed as a function of tempering temperature. The softening on tempering is retarded by silicon and it appears possible to obtain somewhat higher strengths in the silicon steels without a corresponding loss in ductility or in Charpy impact strength. Tables, graphs, micrographs. 12 ref. (Q general, AY)

986-Q. Some Relationships Between Endurance Limit and Torsional Properties of Steel. S. T. Ross, R. P. Sernka and W. E. Jominy. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 10, 1955, 26 p.

Comparison of fatigue and torsion test results shows that the maximum endurance limit of tempered low alloy steels can be approximated from torsional yield strength-hardness data. The torsion yield strength-hardness relation is linear until a region of high hardness is reached where this relation ceases and a condition of instability occurs. Tables, graphs, micrographs. 14 ref. (Q1, Q7, AY)

987-Q. The Influence of Molybdenum and Tungsten on Temper Embrittlement. A. E. Powers. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 11, 1955, 19 p.

Influence of molybdenum and tungsten, up to 2%, on the susceptibility of a 1% Cr, 1% Mn steel. Steels were aged for 1000 hr. at various temperatures within the temper embrittling region and the susceptibility to embrittlement measured from the rise in the transition temperature. Tables, graphs. 21 ref. (Q23, AY)

988-Q. Hardness of Tempered Martensite in Carbon and Low Alloy Steels. R. A. Grange and R. W. Baughman. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 12, 1955, 24 p.

Hardness of martensite in a number of plain carbon and alloy steels, after tempering, for various combinations of temperature and time is presented and data compared to reveal the effect of carbon and alloying elements. An empirical method for estimating, within limits, from chemical composition the hardness of tempered martensite developed from these data. Graphs, tables. 11 ref. (Q29, ST)

989-Q. Deformation of Beryllium Single Crystals at 25 to 500° C. H. T. Lee and R. M. Brick. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 13, 1955, 42 p.

Compression tests at room temperature and 300 and 500° C. conducted on single crystals of beryllium for various orientations. Tables, diagrams, graph, micrographs. 35 ref. (Q24, M26, Be)

990-Q. Grain Boundary Creep in Aluminum Bicrystals. F. N. Rhines, W. E. Bond and M. A. Kissel. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 14, 1955, 31 p.

Grain boundary shearing at high temperature and low tensile stress is found to be spasmodic, beginning with an induction period. Its direction depends exclusively upon that of the maximum shear stress in the grain boundary, but its rate depends as well upon the orientation relationships of the conjugate crystals. Diagrams, graphs, micrographs. 24 ref. (Q3, Q2, Al)

991-Q. Deformation and Fracture Mechanisms of Polycrystalline Magnesium at Low Temperatures. F. E. Hauser, P. R. Landon and J. E. Dorn. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 15, 1955, 19 p.

Determination of the deformation mechanisms in magnesium at low temperature by metallographic and X-ray techniques. Basal slip was found to be the main mechanism of deformation with duplex slip becoming more predominant as the temperature was decreased. Micrographs. 6 ref. (Q24, Q26, Mg)

992-Q. Influence of Cold Work on Strength of Steel At Elevated Temperatures. Paul Shahinian. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 16, 1955, 19 p.

Effect of cold work on the high-temperature properties of a quenched and tempered chromium-molybdenum steel investigated by means of stress-rupture and relaxation tests. Tables, graphs. 16 ref. (Q23, Q4, Q24, AY)

993-Q. Notch Ductile High Strength Nodular Irons. G. A. Sandoz, H. F. Bishop and W. S. Pellini. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 21, 1955, 18 p.

Ferritized nodular iron may be reheated to intercritical temperatures to develop quasi-equilibrium mixtures of untransformed ferrite and austenite. Water quenching and 1200° F. tempering of the partially austenitized material produces high tensile strength and good notch ductility. Tensile strengths of 90,000 psi. may be developed with notch ductility properties equivalent to the ferritized 60,000-psi. grades. Micrographs, diagrams, graphs, tables. 6 ref. (Q23, CI)

994-Q. Fatigue and Anistropy in Copper. M. L. Ebner and W. A. Backofen. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 22, 1955, 13 p.

Copper of commercial purity has been found to exhibit a mechanical anisotropy under fatigue loading which is explained by postulating the presence of a fibrous structure of crack-like flaws aligned parallel to the axis of the wrought bar of test material. Graphs, diagram, photograph. 6 ref. (Q7, Cu)

995-Q. Tensile Properties of Zirconium-Chromium Alloys — Particle-Strengthening Effects. J. H. Keeler. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 26, 1955, 20 p.

Tensile properties of zirconium-chromium binary alloys containing up to 18 atm. % chromium reported for the temperature range −195 to 500° C. The highest yield strength obtained at 500° C. was about 26,000 psi. Tables, graphs, micrographs. 19 ref. (Q27, Zr)

996-Q. Progress in the Development of Creep-Resistant Zirconium Alloys. W. Chubb. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 27, 1955, 25 p.

Mechanical properties of alloys in selected alloy systems were measured at room temperature and 260 and 500° C. Alloys of the type zirconium-tin-molybdenum and zirconium-aluminum-columbium are relatively easy to fabricate, exhibit good strength and ductility at room temperature, and show promise for the development of creep-resistant alloys at 500° C. Tables, graphs. 16 ref. (Q3, Q general, Zr)

997-Q. Effect of Temperature on Delayed Yielding of Mild Steel for Short Loading Duration. Joseph M. Krafft. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 29, 1955, 15 p.

A bar loading technique was developed for applying uniform compressive stress for a duration of 100 microseconds and for allowing measurement of time delay before plastic yielding within this duration. With the apparatus, the relationship between loading stress and delay time was measured for a mild steel at five temperatures in the temperature range 100 to −196° C. Diagrams, graphs, micrograph. 15 ref. (Q23, CN)

998-Q. Static Fatigue of High-Strength Steel. R. H. Raring and J. A. Rinebolt. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 31, 1955, 12 p.

Susceptibility to static fatigue of air-melted, vacuum-melted and argon-melted AISI 4340 steel at the 230,000-psi. and 280,000-psi. strength levels determined by applying sustained loads to notched tensile specimens. Diagrams, graphs, micrographs. 6 ref. (Q7, AY)

999-Q. Mechanical Properties of Ti-Cr-Mo Alloys as Affected by Grain Size and Grain Shape. H. R. Ogden, F. C. Holden and R. I. Jaffee. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 34, 1955, 39 p.

Mechanical properties of an alpha, a metastable-beta, and an alpha-beta alloy are not altered significantly by changes in grain size or grain shape. Acicular types of structures, obtained by heating into the beta field prior to annealing in the alpha or alpha-beta field, cause a lowering of unnotched tensile ductilities to about the same values as notched tensile ductilities. Fatigue endurance limit is unaffected by grain size or shape and appears to be relatively unaffected by alloy content. Tables, diagrams, graphs, micrographs. 5 ref. (Q general, M27, N3, Ti)

1000-Q. The Initiation of Discontinuous Yielding in Ductile Molybdenum. J. A. Hendrickson, D. S. Wood and D. S. Clark. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 36, 1955, 22 p.

Results of experimental investigation of the initiation of yielding in fine-grained ductile molybdenum under rapidly applied constant stress. Diagrams, graphs, micrographs, tables. 13 ref. (Q23, Mo)

1001-Q. The Mechanical Properties of Vanadium-Base Alloys. W. Rostoker, A. S. Yamomoto and R. E. Riley. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 38, 1955, 22 p.

Tensile properties of unalloyed vanadium, and its binary and ternary alloys. Small additions of titanium and zirconium have a markedly beneficial effect on the ductility of vanadium. Tables, graphs, micrograph. 3 ref. (Q general, V)

1002-Q. Rolling Textures in Tantalum. J. W. Pugh and W. R. Hibbard, Jr. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 39, 1955, 14 p.

Cold rolled and recrystallized textures of tantalum presented as pole figures. Table, diagrams, micrographs. 19 ref. (Q24, Ta)

1003-Q. The Statistical Nature of Friction. E. Rabinowicz, B. G. Rightmire, C. E. Tedholm, and R. E. Williams. *ASME, Transactions,* v. 77, Oct. 1955, p. 981-984.

Sliding experiments using copper surfaces in solid contact. Friction traces analyzed statistically to study spontaneous fluctuations in the friction force. Diagram, graph. 6 ref. (Q9, Cu)

1004-Q. Residual Grinding Stresses in Hardened Steel. H. R. Letner. *ASME, Transactions,* v. 77, Oct. 1955, p. 1089-1098.

Residual stresses resulting from surface grinding a hardened ball-bearing-type steel under closely controlled conditions measured by deflection method. Effects of wheel grade, unit downfeed and grinding fluid upon the stresses generated. Diagram, table, photographs, graphs. (Q25, G18, ST)

1005-Q. The Determination of Residual Stresses in Hardened, Ground Steel. L. V. Colwell, M. J. Sinnott and J. C. Tobin. *ASME, Transactions,* v. 77, Oct. 1955, p. 1099-1104; disc., p. 1104-1105.

Residual surface stresses induced by grinding a hardened SAE 4340 steel investigated by means of X-ray diffraction and by optical interferometric methods. Depth of penetration of residual stresses increases as the severity of grinding is increased. Graphs, tables, diagram. 7 ref. (Q25, G18, AY)

1006-Q. Steam-Piping Design to Minimize Creep Concentrations. Ernest L. Robinson. *ASME, Transactions,* v. 77, Oct. 1955, p. 1147-1158; disc., p. 1158-1162.

Principles governing relaxation of expansion stresses during service at high temperature; possibility of creep concentrations in local spots of max. stress. Specific examples show that ordinary piping design usually can be made without such concentrations. Contrariwise, the type of expansion flexibility which invites excessive creep is illustrated. The desirability of cold springing pipe to minimize stress at high temperature is emphasized. Diagrams, graphs, table. 10 ref. (Q3, ST)

1007-Q. Friction in Cold Rolling and Its Governing Variables. P. W. Whitton. *Australasian Engineer,* 1955, Aug., p. 81, 10 pages.

Examination of effect of load, relative speed, surface finish and work hardening on copper, mild steel, brass and aluminum tested with various lubricants. Diagram, tables, plates. 10 ref. (Q9, F23, CN, Al, Cu)

1008-Q. Effect of Preheating on Residual Stresses in Mild-Steel Welds. L. E. Benson and S. J. Watson. *British Welding Journal,* v. 2, Sept. 1955, p. 372-376.

Mean axial contraction stresses measured in single-run and multi-run welds in mild steel. Tables, diagrams, photograph, graphs. (Q25, K general, AY)

1009-Q. Some Investigations of the Causes of Halo Formation. K. Winterton. *British Welding Journal,* v. 2, Sept. 1955, p. 385-392.

Appreciable strain together with hydrogen is necessary. Haloes are found only in fractured specimens. Micrographs, tables. 5 ref. (Q7, K general)

1010-Q. New Stainless Steels Qualify for High-Temperature Service. I. E. A. Loria. *Iron Age,* v. 176, Sept. 29, 1955, p. 65-67.

Crucible HNM exhibits best strength and ductility with solution temperature of 2000° F. and oil quenching. Graphs, tables. 3 ref. (To be continued.) (Q22, SS)

1011-Q. Internal Friction Peak Associated With Precipitation in an Al-Ag Alloy. A. C. Damask and A. S. Nowick. *Journal of Applied Physics,* v. 26, Sept. 1955, p. 1165-1172.

Specimen quenched from solid solution region and aged at 155° C. shows peak at 140° C. for vibration frequency of 0.25 c.p.s. Graphs. 19 ref. (Q22, Al, Ag)

1012-Q. Materials Engineering File Facts. Hardness Correlations for Titanium Alloys. *Material & Methods,* v. 42, Sept. 1955, p. 137.

Values obtained for Rockwell A and Diamond pyramid hardness values. Graphs. (Q29, Ti)

1013-Q. Residual Stresses. *Metal Progress,* v. 68, Aug. 15, 1955, p. 89-96.

Details for understanding and dealing with these not-to-be-overlooked disturbances. Graphs, diagrams, tables, photographs. (Q25)

1014-Q. Creep and Creep-Rupture Tests. *Metal Progress,* v. 68, Aug. 15, 1955, p. 175-184.

Equipment design recommendations, treatments of different types of data and effects of environment. Graphs, diagrams, circuit diagram, tables. (Q3)

1015-Q. Thermal Stress Fatigue in Austenitic Stainless. (Digest of "The Problem of Thermal Stress Fatigue in Austenitic Steels at Elevated Temperatures", by L. F. Coffin, Jr., American Society for Testing Materials, Special Technical Publication No. 165, October 1954, p. 32-50.) *Metal Progress,* v. 68, Sept. 1955, p. 180, 182, 184.

Test to determine mechanism of failures produced by a relatively limited number of thermal stress cycles under conditions of high cycling temperatures. (Q7, SS)

1016-Q. Effect of Stress Concentration on Rupture Strength. (Digest of "The Effects of Stress Concentrations on the Rupture Strength of Materials Subjected to Creep Loading", by G. Sachs, D. P. Newman and W. F. Brown; *Zeitschrift für Metallkunde,* v. 44, June 1953, p. 233-239.) *Metal Progress,* v. 68, Sept. 1955, p. 198, 200, 202.

Previously abstracted from original. See item 765-Q, 1953. (Q23)

1017-Q. Fatigue Tests on Notched and Unnotched Clad 24 S-T Sheet Specimens to Verify the Cumulative Damage Hypothesis. J. Schijve and F. A. Jacobs. *Netherlands National Luchtvaart-laboratorium Report* M. 1982, Apr. 1955, 66 p.

Attention is given to crack propagation, influence of cladding, inhomogeneity of sheet and distribution of fatigue test results. Graphs, diagrams, photographs, tables. (Q7, Al)

1018-Q. The Relation Between Friction and Wear for Boundary-Lubricated Surfaces. E. Rabinowicz. *Physical Society, Proceedings,* v. 68, no. 429B, Sept. 1955, p. 603-608.

Experiments in which metal transfer and loose wear were measured. Graphs. 7 ref. (Q9)

1019-Q. Deformation Properties of Friction Junctions. J. A. Greenwood and D. Tabor. *Physical Society, Proceedings,* v. 68, no. 429B, Sept. 1955, p. 609-619.

Investigation of sliding friction by shearing large-scale models under conditions where no displacements are allowed. Graphs, diagrams, tables. 6 ref. (Q9)

1020-Q. The Contact Resistance and Mechanical Properties of Surface Films on Metals. R. W. Wilson. *Physical Society, Proceedings,* v. 68, no. 429B, Sept. 1955, p. 625-641.

Investigation of electrical contact resistance and coefficient of friction of many noble and base metals in both clean and lubricated states. Diagrams, graphs, tables. 21 ref. (Q9, P15)

1021-Q. Preventing Embrittlement in Copper-to-Aluminum Weld Joints. C. L. Carlson and R. M. Leedy. *Product Engineering,* v. 26, Oct. 1955, p. 172-173.

Joint embrittlement results from logarithmic growth of a brittle diffusion layer. Safe temperature-with-time data given, as determined by impact test. Graph, diagram, micrographs. (Q23, K general, Al, Cu)

1022-Q. How to Prevent Fatigue Failures. Joseph Viglione. *Product*

Engineering, v. 26, Oct. 1955, p. 174-178.

Practical, nonmetallurgical discussion of causes for fatigue failures, such as surface finishes and coatings, fillets, temperature and corrosion. Design suggestions for increasing fatigue life of welded and riveted joints and bolted connections. Photograph, tables. (Q7, K1, K13)

1023-Q. Apparatus for the Measurement of the Internal Friction of Metals in Transverse Vibration. B. S. Berry. *Review of Scientific Instruments,* v. 26, Sept. 1955, p. 884-887.

Incorporates specially designed piezoelectric pickup serving in turn as exciter and detector. Diagrams, graphs. (Q22)

1024-Q. Stress-Relaxation and Stress-Relief of Some Magnesium Alloys. Paul Klain. *Welding Journal,* v. 34, Sept. 1955, p. 415S-423S.

Stress-relaxation measurements by simple and cantilever beam and requirements of stress relief. Photographs, diagram, tables, graphs. 6 ref. (Q25, J1, Mg)

1025-Q. Stress Studies of Various Shaped Welded Doubler in Hatch Corner. H. Kihara, Y. Akita, N. Ando and K. Yoshimoto. *Welding Journal,* v. 34, Oct. 1955, p. 465S-471S.

Welded ship hatch corner specimens, with doubler reinforcements of various shapes welded thereto, tested under tension to determine most effective shape of doubler. Trapezoidal and oval shapes found to be the best. Diagrams, table, photograph, graphs. 4 ref. (Q25, K1)

1026-Q. Room Temperature Crack Propagation and Size Effect on Mild Steel. J. D. Lubahn. *Welding Journal,* v. 34, Oct. 1955, p. 518S-528S.

Observations of fracture during notch-bend tests. Photographs, micrographs, graphs, tables. 17 ref. (Q26, CN)

1027-Q. (English.) **Investigation on Acid-Resistant High-Silicon Iron. I.** Hiroshi Sawamura, Osamu Tajima and Kyoichi Akamatsu. *Kyoto University, Memoirs of the Faculty of Engineering,* v. 17, no. 3, July 1955, p. 231-251.

Effects of carbon and silicon contents on mechanical properties, corrosion resistance and shrinkage. Diagrams, graphs, tables, photographs, micrographs. 23 ref. (Q general, R general, C, Si, Fe)

1028-Q. (Czech.) **Testing of Metals for Relaxation at High Temperatures.** Alexander A. Chit'kov. *Hutnické listy,* v. 10, no. 8, Aug. 1955, p. 450-455.

Two theories for reconciling relation between creep and relaxation; differences between measured relaxation values and those calculated from creep values; Czech methods of measuring relaxation according to Barr and Bardgett. Tables, diagrams, photograph. (Q3)

1029-Q. (Czech.) **Cylinder Head Failures.** Jar. Pacher. *Strojirenstvi,* v. 5, no. 3, Mar. 1955, p. 195-198.

Effect of cooling rate on stresses and differences between thermal stressing of cylinder heads in gasoline and diesel engines; methods of determining stresses in castings; advantages of tensometric measurement; design changes by which cracking of cylinder heads was eliminated. Graphs, diagrams, table. 3 ref. (Q26, CI)

1030-Q. (Czech.) **Testing Material of Type CrV, CrMoV, and CrWV for Fatigue at Elevated Temperatures.** J. Buzek. *Strojirenstvi,* v. 5, no. 4, Apr. 1955, p. 282-285.

Chemical compositions and mechanical properties of materials tested, methods and testing equipment for bending and torsion fatigue testing. Graphs, circuit diagram, tables, photographs. (Q7, AY)

1031-Q. (French.) **Permanent Deformation of Polycrystalline Solids After the Action of a High Hydrostatic Pressure.** Hai Vu and Pierre Johannin. *Comptes rendus,* v. 241, no. 6, Aug. 8, 1955, p. 565-566.

Specimens of zinc, cadmium and aluminum were micrographed before and after hydrostatic compression. The first two are deformed, aluminum is not. Micrographs. (Q28, Zn, Cd, Al)

1032-Q. (French.) **Impact Testing of Lamellar Graphite Cast Irons.** G. N. J. Gilbert, *Fonderie,* 1955, no. 115, Aug., p. 4627-4640.

Characteristics that are measured during impact testing of gray cast iron. Role of the notch and the effects of various dimensions of bars. Tables, diagrams, photographs, graphs. 6 ref. (Q6, CI)

1033-Q. (German.) **Expansion-Free Directions in a Stress Condition and Its Importance for X-Ray Stress Measurement, and Study of Structures.** Fritz Binder and Eckard Macherauch. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 541-545.

Equations for expansion-free directions, data of X-ray investigation, determination of lattice-constant-zero value, stress components, possibilities of verification of the elasticity theory. Graphs, diagrams. 14 ref. (Q25)

1034-Q. (Italian.) **On Knoop-Microhardness of a Series of Structural Constituents of Aluminum Alloys.** D. Gualandi and M. Paganelli. *Metallurgia italiana,* v. 47, no. 8, Aug. 1955, p. 362-366.

Tested with Tukon instrument for ten constituents. Photograph, micrographs, graphs. 10 ref. (Q29, M27, Al)

1035-Q. (Russian.) **Problem of the Nature of the Plastic Deformations of Surface Layers of Substances Subjected to Friction Processes.** K. V. Savitskii, E. N. Sokolkov, and V. D. Sadovskii. *Doklady akademii nauk SSSR,* v. 103, no. 4, Aug. 1, 1955, p. 605-608.

Dynamic and static compression; effect of tempering temperature and original structure; microhardness. Graphs. 3 ref. (Q29, Al, Cu)

1036-Q. (Russian.) **Mechanism of the Fracture of Specimens With a Standard Notch During Impact Bending.** B. S. Kasatkin. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 7, July, p. 75-83.

Passage of steel from tough to brittle state during impact bending, toughness in relation to temperature, microstructure of the deformed sector of metal around the notch as microrupture is about to develop, resulting microcracks, orientation, and spread. Diagrams, graph, photograph, micrographs. 5 ref. (Q5, Q6, Q26, ST)

1037-Q. (Russian.) **Creep of Cast Iron Containing Spherodial Graphite.** V. S. Ivanova and I. A. Oding. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 7, July, p. 89-92.

Microstructure, strength tests at 450° C., resistance of specimens to "growth", desirability of nodular iron as a structural material for service under high-temperature conditions. Micrograph, graph. 5 ref. (Q3, M27, CI)

1038-Q. (Russian.) **Effect of Plastic Deformation in the Austenitic State on Temper Brittleness of Structural Alloy Steels.** L. V. Smirnov, E. N. Sokolkov and V. D. Sadovskii. *Doklady akademii nauk SSSR,* v. 193, no. 4, Aug. 1, 1955, p. 609-610.

Reversible and irreversible temper brittleness, relation of impact toughness to tempering temperature after the usual quenching and hot working. Graphs. 5 ref. (Q24, Q23, ST)

1039-Q. (Russian.) **Development of "Embryonic" Cracks Affecting Brittle Strength of Substances.** B. Ia. Pines. *Zhurnal tekhnicheskoi fiziki,* v. 25, no. 8, Aug. 1955, p. 1399-1404.

Lack of agreement between values of "brittle strength", observed experimentally and those estimated according to magnitude of cohesive forces, has long been explained by the hypothesis of the presence in solid substances of so-called embryonic cracks which bring about premature failure. The author attempts to trace the origin of these cracks to molecular and atomic forces, the movement of vacancies, and diffusion peculiarities. 7 ref. (Q26)

1040-Q. Abrasive Jet Method for Measuring Abrasion Resistance of Organic Coatings. A. G. Roberts, W. A. Crouse and R. S. Pizer. *ASTM Bulletin,* 1955, no. 208, Sept., p. 36-41.

Simple, rapid, reproducible method. Photographs, tables, graphs. (Q9)

1041-Q. A Transistor Torquemeter. J. A. Freer. *Electronic Engineering,* v. 27, Oct. 1955, p. 430-433.

Value of torque is inferred from measurement of relative phase between waveforms produced by generators attached at either end of shaft. Diagrams, circuit diagrams. 6 ref. (Q1)

1042-Q. Crack Formation and Stress Concentration Effects in Direct Stress Fatigue. I. N. E. Frost. *Engineer,* v. 200, Sept. 30, 1955, p. 464-467.

Reversed tests carried out on V-notched cylindrical specimens of aluminum alloys. Graphs, micrographs, tables. 5 ref. (To be continued.) (Q7, Al)

1043-Q. New Stainless Steels Qualify for High-Temperature Service. II. E. A. Loria. *Iron Age,* v. 176, Oct. 13, 1955, p. 109-111.

Recent research on stainless steels was aimed at development of nickel-free grades. One such steel—Crucible CMC—has high resistance under stress at high temperatures. It also has good oxidation resistance at temperatures up to 2100° F. Graph, tables. 2 ref. (Q3, Q4, R2, SS)

1044-Q. 475° C. Embrittlement of Chromized Coatings on Low Carbon Steel. W. L. Chu. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Oct. 1955, p. 1121-1123.

Coating structure and composition can be correlated with chromizing process and prior carbon content of steel. Photograph, table, micrographs. 3 ref. (Q23, L15, Cr, CN)

1045-Q. The Effect of Neutron Flux on the Mechanical Properties of Aluminum Alloys. R. V. Steele

and W. P. Wallace. *Livermore Research Laboratory, California Research and Development Company (U. S. Atomic Energy Commission)*, LRL-145, May 1954, 20 p.

Aluminum alloys 2S-O, 2SH-14, 52S-O, 52S-H34, 61S-O, 61S-T6 and A54S were irradiated at a maximum temperature of 150° F. to a total neutron irradiation of 1.26 x 10^{21} neutrons per sq.cm. in order to determine the effect of neutron irradiation on the mechanical properties. It was determined that the flow stress was increased markedly, particularly for the soft tempers, by the neutron exposure. The usual tensile strength was increased by the irradiations, whereas the percentage of elongation was decreased, but not in every case. Graphs, tables, photograph, diagram.
(Q27, P10, Al)

1046-Q. Factors Influencing Friction & Wear With Solid Lubricants. M. B. Peterson and R. L. Johnson. *Lubrication Engineering*, v. 11, Sept.-Oct. 1955, p. 325-330.

Most data obtained with molybdenum sulfide using low-speed friction and wear apparatus for steel test specimens. Photograph, graphs, tables, micrograph. 8 ref. (Q9, ST)

1047-Q. The Structure and Mechanical Properties of White Irons. W. J. Williams. *Metallurgia*, v. 52, no. 311, Sept. 1955, p. 129-134.

Specimens of white iron, even when cast from the same melt, may show a scatter in mechanical test results of as much as ± 20% of the average value. Structure of white irons, way in which changes in structure are likely to influence mechanical properties. Micrographs, photographs. 3 ref.
(Q general, M27, CI)

1048-Q. Ductile Iron-Aluminum Alloys. Eric R. Morgan and Victor F. Zackay. *Metal Progress*, v. 68, Oct. 1955, p. 126-128.

Ductile iron-aluminum alloys with oxidation resistance and high-temperature strength, equivalent to conventional stainless steels, produced by vacuum melting. Graphs, photographs. (Q23, R2, D8, SG-h)

1049-Q. Large Elastic Deformation of Isotropic Materials. X. Reinforcement by Inextensible Cords. J. E. Adkins and R. S. Rivlin. *Royal Society of London, Philosophical Transactions*, v. 248, ser. A, no. 944, Sept. 1955, p. 201-223.

Pure homogeneous deformation of thin sheet, flexure of cuboid containing inextensible cords, simultaneous extension, inflation and torsion of reinforced cylindrical tube. 12 ref. (Q21)

1050-Q. How to Test Refractory Metals. J. W. Pugh. *Steel*, v. 137, Oct. 17, 1955, p. 114-117.

Equipment and methods for tensile and creep-rupture tests. Photographs, diagrams.
(Q3, Q4, Q27, EG-d)

1051-Q. Mechanical Properties of Aluminum Honeycomb Cores. Edward W. Kuenzi. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1849, Sept. 1955, 57 p.

Results of tests on commercially produced aluminum honeycomb cores for use in structural sandwich construction. Graphs, photographs, tables, diagram. 14 ref.
(Q general, Al)

1052-Q. (Dutch.) **Morphological Study of the Phenomenon of Fracture.** J. Leeuwerik and F. Schwarzl. *T.N.O.-Nieuws*, v. 10, no. 114, Sept. 1955, p. 367-374.

Significance of microstructure in the fracture process; origin of fracture; direction of the propagation of fracture. Mechanism and rate of fracture. Micrographs, diagrams, graphs. 4 ref. (Q26, M27)

1053-Q. (French.) **Ultrasonic Measurements of the Elastic Constants of Solids.** Guy Mayer and Jean Gigon. *Journal de physique et le radium*, v. 16, nos. 8-9, Aug.-Sept. 1955, p. 704-706.

Process for the emission of acoustical waves in gases provides new method for measuring Young and Poisson moduli and the internal friction of solids. Diagram. 6 ref.
(Q21, Q22)

1054-Q. (French.) **Determination of the Elastic Constants of Metallic Materials by Measuring the Propagation of Sound. Application to Cast Iron.** H. J. Seemann and H. Schmauch. *Revue de métallurgie*, v. 52, no. 8, Aug. 1955, p. 621-628; disc., p. 628.

Results discussed in relation with cast iron graphite nature and compared with moduli determined values obtained by static procedures. Diagram, photographs, graphs, micrographs. 14 ref. (Q21, P10, CI)

1055-Q. (French.) **Plastic Deformation of Refined Aluminum and Alloyed Aluminum Monocrystals.** B. Jaoul and I. Bricot. *Revue de métallurgie*, v. 52, no. 8, Aug. 1955, p. 629-642.

Transition point in load extension curve varies according to pur-

ity. Graphs, micrographs, photographs, tables. 27 ref. (Q24, Al)

1056-Q. (French.) **Some Observations About Temper Brittleness.** L. Colombier. *Revue de métallurgie,* v. 52, no. 8, Aug. 1955, p. 643-656; disc., p.656-659.

Investigation of change in transition point of tensile strength temperatures diagram for steel grades, in which analysis of one constituent was varied. Tables, graphs. 6 ref. (Q23, ST)

1057-Q. (German.) **Why Aluminum Bearings?** Obering A. Buske and F. W. Rabenau. *Aluminium,* v. 31, no. 10, Oct. 1955, p. 493-498.

Some tested alloys which have rendered good service. Photographs, micrographs, graphs. (Q9, T7, Al)

1058-Q. (German.) **Hardness Determination of Solid Bodies. I.** P. Grodzinski. *Archiv für technisches Messen,* 1955, no. 236, Sept., p. 201-204.

Principles and different methods of hardness determination, static macro and microhardness, scratch hardness, hardness scales. Graphs, table. 82 ref. (Q29)

1059-Q. (Russian.) **Plastic Flow of Anisotropic Films.** M. S. Mikeladze. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 8, Aug., p. 67-80.

Basic laws of plastic flow of anisotropic media; equations for plastic equilibrium of single and multilayer films or coatings; nature of deformations and stress distribution. 11 ref. (Q24, L general)

1060-Q. (Russian.) **Complex Loading and Theories of Plasticity of Isotropic Metals.** A. M. Zhukov. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 8, Aug., p. 81-92.

Formulas for theory of small elasto-plastic deformations and theory of flow. Fracture in metals stressed bi-axially; tension-torsion equations. Graphs, table. 10 ref. (Q23, Q24)

1061-Q. (Russian.) **Rolled and Recrystallization Textures of Titanium.** N. V. Ageev and A. A. Babareko. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 8, Aug., p. 100-106.

Recrystallization orientations, deformation mechanisms, twinning, slip phenomena, effect of rolling temperature and technique on texture, deformation percentage with recrystallization and resulting texture. X-rays, diagrams. 12 ref. (Q24, N5, Ti)

1062-Q. (Russian.) **Resistance to Repeated Bending of Steel Strips With Weld-Attached Transverse Ribs.** V. A. Bykov and V. A. Nikitin. *Svarochnoe proizvodstvo,* 1955, no. 9, Sept., p. 8-10.

Fatigue and yield point compared in low-alloy and carbon steel test pieces; factors affecting development and position of failure. Graphs, tables, diagrams. 3 ref. (Q7, Q5, CN, AY)

1063-Q. (Russian.) **Cold Shortness of Welded Seams Made by Automatic Welding Under Flux.** A. G. Mazel and E. M. Rogova. *Svarochnoe proizvodstvo,* 1955, no. 9, Sept., p. 11-13.

Impact toughness of low-alloy and unalloyed steels at various temperatures. Threshold temperature of cold shortness, chemical composition of welded seams. Tables, graphs. 7 ref. (Q6, K1, ST, AY)

1064-Q. (Russian.) **Antifriction Properties of Spheroidal Cast Iron.** I. O. Tsypin, P. I. Durasov and N. F. Verzhbitskii. *Vestnik mashinostroeniia,* v. 35, no. 9, Sept. 1955, p. 56-61.

Microstructures and chemical compositions of spheroidal pearlitic, pearlito-ferritic, other cast iron. Wear in roller bearings and bushings of cast iron, and running-in tests. Micrographs, diagrams, tables. 3 ref. (Q9, M27, CI)

1065-Q. **High Temperature Effects in Aircraft Structures.** N. J. Hoff. *Applied Mechanics Review* v. 8, Nov. 1955, p. 453-456.

Reduction in strength and stiffness, thermal stresses and buckling, effects of creep on distribution and failure, creep buckling. 61 ref. (Q general, T24)

1066-Q. **Deoxidation of Malleable Iron.** Ariel Taub. *Foundry,* v. 83, Nov. 1955, p. 131-133.

Effect on malleabilization and final mechanical properties after introducing aluminum into the cupola melt. Micrographs, graph, table. (Q general, E10, Al, CI)

1067-Q. **Rapid Creep in Structures.** N. J. Hoff. *Journal of the Aeronautical Sciences,* v. 22, Oct. 1955, p. 661-672, 700.

Proposes that rapid creep be tolerated when areodynamic heating causes high temperatures for only a short time in structural elements of supersonic aircraft. Tables, graphs, diagrams, photographs. 33 ref. (Q3)

1068-Q. **Theory of Steady-State Creep Based on Dislocation Climb.** J.

Weertman, *Journal of Applied Physics,* v. 26, Oct. 1955, p. 1213-1217.

It is assumed in the analysis that the rate-controlling process is the diffusion of vacancies between dislocations which are creating vacancies and those which are destroying them. Graph, tables. 19 ref. (Q3, M26)

1069-Q. Heat Treated Titanium Offers New Design Possibilities. *Metal Treating,* v. 6, Sept.-Oct. 1955, p. 20-21.

Treatment of Rem-Cru C-130 AM (4Mn-4Al) increases elevated temperature strength, creep, fatigue and shear strength, but apparently neither decreases ductility nor increases notch sensitivity. Graphs. (Q general, J general, Ti)

1070-Q. (French.) **Abrasive Effect of Light Alloys on Cutting Tools.** Carlo Panseri and Gino Bedeschi. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 177-183; disc., p. 183.

Abrasive power depends on structure, quantity, degree of subdivision and hardness of insoluble constituents. Photographs, diagrams, tables, micrographs. (Q9, G17, EG-a)

1071-Q. (French.) **The Viscosity of Metallic Wires.** Constantin Salceanu. *Comptes rendus,* v. 241, no. 12, Sept. 19, 1955, p. 734-736.

Apparatus for measuring, based on determination of the time necessary to reduce half the initial amplitude of the oscillations of a torsion pendulum, whose suspension wire is made of the metal to be studied. Results of tests on aluminum wire given. Diagram, table. 1 ref. (Q1, Al)

1072-Q. (Hungarian.) **Examination of the Properties of Special Ductile Alpha + Beta Yellow Brass, as Affected by Heat Treatment. II.** Ede Bella. *Kohaszati lapok,* v. 10, no. 9, Sept. 1955, p. 425-427.

Most important mechanical properties of the experimental alloys. Heat treatment experiments. Micrographs. (To be continued.) (Q23, J general, Cu)

1073-Q. (Russian.) **First Basic Problem of the Theory of Elasticity for a Region With a Plane Circular Hole.** V. I. Mossakovskii. *Prikladnaia matematika i mekhanika,* v. 19, no. 4, July-Aug. 1955, p. 443-452.

Calculations for an elastic region (an isotropic elastic body of infinitely large dimensions) which has been weakened by a plane circular hole. 10 ref. (Q21)

1074-Q. An Investigation of Fatigue Failures in Structural Members of Ore Bridges Under Service Loadings. L. T. Wyly and M. B. Scott. *American Railway Engineering Association Bulletin,* v. 57, no. 524, Sept.-Oct. 1955, p. 175-297.

Field tests made on ore handling bridges and a study of actual failure records. Recommendations for improving fatigue life of structural members. Graphs, tables, diagrams. (Q7, ST)

1075-Q. Rail Corrugation—Can It Be Prevented? C. H. Spaderna. *American Railway Engineering Association, Bulletin,* v. 57, no. 524, Sept.-Oct. 1955, p. 307-312.

High train speeds may bring forth undulations 0.01 in. deep that accelerate wear on rails; establishes a relation between natural frequencies of rail vibration and wave length of the corrugation. Tables, diagrams. (Q9, ST)

1076-Q. Room and Elevated-Temperature Mechanical Properties of AISI Type 414 and Type 431 Stainless Steels. E. J. Dulis, S. J. Parker and P. W. Marshall. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 41, 1955, 23 p.

To evaluate the applicability of the steels as materials for the construction of equipment used under stress at elevated temperatures, the room and elevated-temperature tensile properties in the range 700 to 1100° F., creep and creep-rupture properties in the range 900 to 1200° F., and keyhole-notch Charpy transition temperatures were determined. Tables, micrographs, graphs. 6 ref. (Q27, Q3, Q4, Q6, SS)

1077-Q. Deformation Mechanisms of Alpha-Uranium Single Crystals. L. T. Lloyd and H. H. Chiswik. *Argonne National Laboratory (U. S. Atomic Energy Commission),* ANL-5367, Dec. 1954, 99 p.

Considers slip, twinning, cross-slip and kinking. Diagrams, graphs, micrographs, tables. 47 ref. (Q24, U)

1078-Q. Welding Stresses Crack Penstocks. *Engineering News-Record,* v. 155, Nov. 3, 1955, p. 32-33.

A specific case of the effect of locked-in stresses, from welding heavy steel plates, and the costly remedial measures required. Photograph, diagram. (Q25, K general, ST)

1079-Q. The Effect of Different Chromium Deposits on the Fatigue Strength of Hardened Steel. Jesse E. Stareck, Edgar J. Seyb, Jr., and Angelo C. Tulumello. *Plating,* v. 42, Nov. 1955 p. 1395-1402.

Effect is related to stress in deposit; study made on SAE 4140. Tables, graphs. 16 ref.
(Q7, L17, Cr, ST)

1080-Q. Brittle Fracture and Yielding. A. N. Stroh. *Philosophical Magazine,* v. 46, 7th ser., no. 380, Sept. 1955, p. 968-972.

Stresses around a piled-up group of dislocations may initiate a crack or pull it from its locking impurities. 10 ref. (Q23, Q26)

1081-Q. Fatigue Properties of Comparable Cast and Wrought Steels. *Steel Founders' Society of America, Research Report No.* 35, Oct. 1955, 40 p.

Effects of steel composition, heat treatment, surface finish, directionality and section size on fatigue of small standard notched and smooth bar laboratory specimens in rotary bending. Tables, graphs, diagrams. 24 ref. (Q7, CI, ST)

1082-Q. Elastic Stability of Cylindrical Sandwich Shells Under Axial and Lateral Load. Everett Eugene Haft. *U. S. Department of Agriculture, Forest Products Laboratory, Report No.* 1852, July 1955, 24 p. + 9 plates.

Mathematical analyses and curves that show how buckling load changes as parameters change. Diagrams, graphs. 4 ref. (Q28, Q21)

1083-Q. A Universal Column Formula for Load at Which Yielding Starts. L. H. Donnell and V. C. Tsien. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3415, Oct. 1955, 48 p.

Accounts for initial defects and yielding limit of materials. Diagrams, graphs, photographs, table. 12 ref. (Q23)

1084-Q. Ductility Tests for Electrical Conductors. Louis Boleraski. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1210 + 4 pages.

With coordination of electrical conductivity measurements, durability and practicability are determined prior to costly cable fabrication and installation. Photographs, graphs. (Q23, P15, Al)

1085-Q. (Czech.) **The Relaxation Testing of Metals at High Temperatures.** Alexander A. Chit'kov. *Hutnické listy,* v. 10, no. 9, Sept. 1955, p. 521-525.

Requires special automatic devices or calculation from residual elastic strains on round test specimens and models of flanged joints stressed in tension, test rings stressed in bending and helical springs stressed in torsion. Graphs, diagrams. (Q21, Q25)

1086-Q. (German.) **Influence of the Degree of Stress on Fatigue Strength.** H. O. Meuth. *Metall,* v. 9, nos. 19-20, Oct. 1955, p. 861-867.

Experimental investigation on mild carbon steel and the aluminum-magnesium alloy, Hy7. Graphs, tables, micrographs. 15 ref.
(Q7, Al, CN)

1087-Q. (German.) **Tensile Test of Tubes With Bore-Diminished Circumferential Seams.** Kurt Kautz. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 384-386.

Proposes simple method for examination of welded pipe joints. Photographs, tables, diagram.
(Q27, K9)

1088-Q. (German.) **The Bending Test.** N. Ludwig. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 387-391.

Conventional specimens and performances compared when bent according to German standards. Photograph, tables, diagrams. 10 ref.
(Q5, K9)

1089-Q. (German.) **Determination of Fatigue Strength of Welded Joints.** Karl Wellinger. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 392-396.

Compares forced and endurance fractures; influence of surface quality of test specimens and finished parts. Photographs, diagrams, graphs, table. (Q7, Q26, K9)

1090-Q. (German.) **Creep Strength Tests at Welded Joints.** Wilhelm Ruttmann. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 397-399.

Supplementary considerations on proposed German standards. Table, diagrams. 4 ref. (Q3, K9)

1091-Q. (German.) **Determination of Thermal Crack Resistance.** E. Kauhausen and P. Kaesmacher. *Schweissen und Schneiden,* v. 7, no. 9, Sept. 1955, p. 400-404.

Problems of testing austenitic electrodes. Photographs, diagrams.
(Q26, K9)

1092-Q. (German.) **Approximate Calculation of "Notch Toughness-Temperature" Curves in the Region of the Transition Temperature.** Heinz Kornfeld. *Stahl und Eisen,* v. 75, no. 20, Oct. 6, 1955, p. 1324-1330.

Six examples show different types of fracture, probability of mixed fracture. Tables, graphs.
(Q23, Q26, ST)

1093-Q. (German.) **Hardening of Aluminum-Silver Alloys. IX. X-Ray Investigation of Cold-Hardening. X.**

Temperature Dependence of Electrical Resistance. Volkmar Gerold, Werner Köster and Alfons Knödler. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 623-639.

Interpretation of radiographic findings. Temperature-resistance curves of aluminum alloys with 3.5 to 55.6 wt.% silver. Graphs, tables. 44 ref. (Q29, P15, Ag, Al)

1094-Q. (German.) **Slip Mechanism and Surface Phenomena in Face Centered Cubic Metals.** Jörg Diehl, Siegfried Mader and Alfred Seeger. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 650-657.

Theoretical and experimental data of problem. Method of sample making. Diagram, graph, table, photographs. 35 ref. (Q24)

1095-Q. (German.) **Smelted Metal Properties. XI. Internal Friction of Magnesium-Tin Alloys.** Erich Gebhardt, Manfred Becker and Heinrich Sebastian. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 669-672.

Experiments and data on relation of internal friction, temperature, concentration and activating energy of viscous flow. Graphs, tables. 16 ref. (Q22, Mg, Sn)

1096-Q. (Russian.) **Law of Friction With Highly Elastic Materials Along Hard Smooth Surfaces.** G. M. Bartenev. *Doklady akademii nauk, SSSR,* v. 103, no. 6, Aug. 21, 1955, p. 1017-1020.

Relation of friction force to normal pressure. Graphs. 11 ref. (Q9)

1097-Q. (Russian.) **Problems of Dynamic Strength in Rotors and Turbogenerators.** R. D. Vagapov, F. M. Dimentberg and S. V. Serensen. *Izvestiia akademii nauk SSSR, otdelenie tekhnicheskikh nauk,* 1955, no. 9, Sept., p. 65-106.

Vibratory stressed state of rotor, distribution of stresses in the most dynamically stressed parts of the rotor, strength of rotor during action of alternating stresses, fatigue. Graphs, diagrams, tables. 26 ref. (Q23, Q25, Q7, ST)

1098-Q. (Russian.) **Investigation of the Interaction of Lubricating Oils With Metals.** G. V. Vinogradov, M. M. Kusakov, Iu. S. Zaslavskii and E. A. Razumovskaia. *Vestnik akademii nauk SSSR,* v. 25, no. 9, Sept. 1955, p. 35-40.

Relation of wear spots to axial loads and of amount of sulfur, per surface area, to temperature. Types of lubricants for various steels. Graphs. (Q9, ST)

1099-Q. (Russian.) **Method for Determining the Tendency of Structural Steel to Deformation Aging.** K. M. Pogodina-Alekseeva. *Zanadskaia laboratoriia,* v. 21, no. 9, 1955, p. 1104-1106.

Influence of deformation aging on strength properties of structural 3KP steels; description of the method and installation used. Graphs. (Q24, N7, ST)

1100-Q. (Russian.) **Method of Testing Metals for Abrasive Wear.** V. V. Podgaetskii. *Zavodskaia laboratoriia,* v. 21, no. 9, 1995, p. 1109-1110.

Installations and testing procedure. Table, photograph, diagram. (Q9)

1101-Q. (Spanish.) **Comparison Between the Flow-Bending Test on a Notched Specimen and the Charpy Test on a Notched V-Specimen in Order to Evaluate the Susceptibility of Carbon-Manganese Steel to Notching.** W. Barr, J. H. Van der Veen, Per Matton-Sjöberg, H. Herbiet and H. Vinter. *Ciencia y técnica de la soldadura,* v. 5, no. 25, July-Aug. 1955, 13 p.

Two tests resulted in an analogous classification for carbon-manganese steel plate specimens 25.4 mm. thick. Diagram, graphs, tables. (Q23, Q6, AY)

1102-Q. (Swedish.) **Lead in Cast Iron; Its Effect on Mechanical Properties and Its Removal From Molten Iron in Induction Furnace.** G. Ostberg. *Gjuteriet,* v. 45, no. 7, July 1955, p. 96-98.

Presence of lead in gray cast iron, usually caused by contamination from scrap, was found to lower the tensile and impact properties while raising the hardness. Laboratory experiments with 2 k-g. melts carried out to find a guide for the removal of lead in induction furnaces by evaporation at constant temperature. Tables, graphs. 5 ref. (Q23, Q6, Q29, D6, CI)

SECTION R

CORROSION

1-R. The Oxidation of Copper and Zinc. E. R. S. Winter. *Chemical Society, Journal,* 1954, Oct., p. 3342-3344.
Studies of oxidation mechanism in terms of defect structures. (R2, Cu, Zn)

2-R. Galvanic Anodes Control Induced Voltages on Pipe Lines. E. H. Thalmann. *Corrosion,* v. 10, Nov. 1954, p. 367.
Problem requiring good ground-to-pipeline contact. Diagram. (R10)

3-R. Corrosion of Refinery Equipment by Sulfuric Acid and Sulfuric Acid Sludges. V. J. Groth and Raymond J. Hafsten. *Corrosion,* v. 10, Nov. 1954, p. 368-389; disc., p. 389-390.
Failures, prevention and control. Photographs, tables, graphs. 8 ref. (R5, R6)

4-R. Corrosion Resistance of Cupronickel Alloys Containing 10 to 30 Percent Nickel. Frank L. LaQue. *Corrosion,* v. 10, Nov. 1954, p. 391-399; disc., p. 399.
Application of alloys to corrosive industrial environments. Photographs, graphs, tables. 19 ref. (R general, T general, Ni, Cu)

5-R. Extrinsic Line Current Fluctuations Seriously Restrict Progress of Coating Conductance Surveys on Large Trunk Line. G. I. Russell and L. B. Nelson. *Corrosion,* v. 10, Nov. 1954, p. 400.
Anomalous currents in Trans-Mountain's 24-in. wrapped oil line. 3 ref. (R1, CN)

6-R. Internal Corrosion in Domestic Fuel Oil Tanks. R. Wieland and R. S. Treseder. *Corrosion,* v. 10, Nov. 1954, p. 401-406; disc., p. 406.
Residual water is chief offender, coatings failure second. Alkaline $NaNO_2$ inhibits effectively. Photographs, tables, graphs. 2 ref. (R7, R10, CN)

7-R. Inhibitor Evaluation by the Pearson Null Bridge. Barton L. Cross and Norman Hackerman. *Corrosion,* v. 10, Nov. 1954, p. 407-412.
Device measures change in ohmic resistance rather than potential change. Only about 70% correlation is established with other methods. Circuit diagram, graphs. 14 ref. (R10)

8-R. Sulfide Corrosion Cracking of Oil Production Equipment. *Corrosion,* v. 10, Nov. 1954, p. 413-419; disc., p. 419.
Progress report by Technical Unit Committee 1-G of NACE describes latest field studies and preventive measures. Photographs, tables. 5 ref. (R7, ST)

9-R. Maybe Cathodic Protection's the Answer to Your Problem of External Well-Casing Corrosion. Yale W. Titterington. *Oil and Gas Journal,* v. 53, Nov. 8, 1954, p. 178-179.
Method of determining current requirements agrees with down-the-hole surveys. Diagram, graphs. (R10)

10-R. (German.) **Contribution to the Knowledge on the Corrosion of Commercial Iron.** Anton Königer. *Giesserei,* v. 41, no. 21, Oct. 14, 1954, p. 565-569; disc., p. 569-570.
Mechanism of corrosion in the presence of hydrogen ions; hydrogen-depolarizing effect of graphite; and corrosion-inhibiting effect of ionic oxygen. Effect of the cast skin, alloying components and previous treatment on its resistance to corrosion. Diagrams, photographs, graphs. 11 ref. (R general, CI)

11-R. A Potentiostat for Corrosion Study. M. H. Roberts. *British Journal of Applied Physics,* v. 5, Oct. 1954, p. 351-352.
Design and performance of instrument for studying relationship be-

tween electrode potential and corrosion rate. Diagrams. 3 ref. (R11)

12-R. Corrosion Problems in Hospital Practice. S. J. Hopkins. *Corrosion Technology,* v. 1, Nov. 1954, p. 330-332, 343.
Types of corrosion and inhibitors for surgical equipment. Photographs. 3 ref. (R general, R10, ST)

13-R. Detecting Corrosion in Chemical Plant. Horace Manlev. *Corrosion Technology,* v. 1, Nov. 1954, p. 333-335.
Importance of early remedial action, use of ultrasonic inspection for detection of corrosion. Photographs. (R general, S13, ST)

14-R. Corrosion in the Motor-Car. II. The Cooling System. Z. S. Michalewicz. *Corrosion Technology,* v. 1, Nov. 1954, p. 337-339.
Causes and prevention. Photographs. 7 ref.
(R general, Cu, CI, ST, Al, Sn)

15-R. A Survey of Corrosion Inhibitors. A. Bukowiecki. *Engineers' Digest,* v. 15, Oct. 1954, p. 425-427. (From *Schweizer Archiv,* v. 20, no. 6, June 1954, p. 169-186.)
Previously abstracted from original. See item 361-R, 1954. (R10)

16-R. Corrosion by and Deterioration of Glycol and Gycol-Amine Solutions. W. G. Lloyd and F. C. Taylor, Jr. *Industrial and Engineering Chemistry,* v. 46, Nov. 1954, p. 2407-2416.
Clarifications of chemical factors affecting corrosion by aqueous glycol solutions and to indicate some means of controlling plant corrosion. Tables, graphs, diagrams. 30 ref. (R7)

17-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 46, Nov. 1954, p. 75A-76A, 78A.
Duriron shows good performance as anodes for cathodic protection with impressed currents. Photographs. (R10, CI)

18-R. The Application of Cathodic Protection to Chemical Plant. F. D. Murphy. *Industrial Chemist and Chemical Manufacturer,* v. 30, Oct. 1954, p. 483-487.
Compares economics of cathodic and coatings protection. Diagrams, graphs, photograph. 4 ref. (R10)

19-R. Problems of Boiler Water Treatment at Medium and High Pressures. C. W. Drane. *Institute of Fuel, Journal,* v. 27, Oct. 1954, p. 502-509.
Survey of requirements of feed water and boiler water conditioning for plants; boiler water reactions; caustic cracking; problems of high-pressure operation; boiler corrosion. Diagrams, graphs. 28 ref. (R4, R10)

20-R. The Selective Oxidation of Nickel-Chromium Alloys at High Temperatures. J. Moreau and J. Bénard. *Institute of Metals, Journal,* v. 83, Nov. 1954, p. 87-93; disc., p. 93 + 3 plates.
Tests at 800 to 1250° C. in a hydrogen + water vapor atmosphere on a 4.6% chromium alloy showed oxide structure differs markedly from structure of the metal surface. Mechanism of oxide formation. Graph, micrographs, table, diagrams. 8 ref. (R2, Ni, Cr)

21-R. Corrosion Resistance of Titanium in Hydrochloric Acid and Sulfuric Acid. Warren W. Harple. *Materials & Methods,* v. 40, Nov. 1954, p. 106-108.
Curves for concentration vs. rate at various temperatures. Graphs, table. (R5, Ti)

22-R. Sacrificial Anodes at Work. T. R. B. Watson. *Modern Metals,* v. 10, Nov. 1954, p. 82-84.
Savings gained by application of magnesium anodes for protection of various steel installations. Diagrams. (R10, ST, Mg)

23-R. Corrosion of Nickel Cast Irons in Soils. *National Bureau of Standards, Technical News Bulletin,* v. 38, Nov. 1954, p. 160-161.
Evaluation of effects of varying amounts of nickel in castings with respect to weight losses and pitting, corrosion mechanics, hydraulic bursting pressure measurement and residual strength. Table, photograph. 2 ref. (R8, Q23, CI)

24-R. How to Control Vapor-Zone Corrosion in Sour-Crude Tanks. A. H. Newberg and J. P. Barrett. *Oil and Gas Journal,* v. 53, Nov. 15, 1954, p. 189-190, 192.
Control by design, use of resistant materials inhibitors, or coatings. Diagram, micrographs. 1 ref.
(R7, R10, L general, CN)

25-R. Corrosion in the Petroleum Industry. I. F. H. Garner and A. R. Hale. *Petroleum,* v. 17, Nov. 1954, p. 407-410.
Corrosion and its mitigation in heaters, fractionators, reactors and condensers. Photographs. (To be continued.) (R7)

26-R. Seawater as an Industrial Coolant. II. Equipment Experience. W. B. Brooks. *Petroleum Refiner,* v. 33, Nov. 1954, p. 179-182.
Dow's experience at Freeport,

Texas, on corrosion problems. Photographs. (R4)

27-R. (German.) **Cathodic Protection of Pipe Lines. I. Principles and Process of Cathodic Protection Against Corrosion.** H. Steinrath. *Erdöl und Kohle,* v. 7, no. 10, Oct. 1954, p. 647-650.

Minimum and maximum protective current for a given type, size and soil condition. Effects of stray anodic or cathodic currents. Tables, graph, diagram. 30 ref. (R10, R8)

28-R. (German.) **Temporary Anti-Corrosion Measures.** Erich Rabald. *Werkstoffe und Korrosion,* v. 5, no. 10, Oct. 1954, p. 368-392 + 1 plate.

Survey of common practices. Special atmospheres, removable coatings, tests for coatings. Tables, graphs, photographs, diagram. 250 ref. (R10, L general)

29-R. (German.) **The Corrosion of Metals and Metallic Coatings in Tropical and Subtropical Climates.** Willi Machu. *Werkstoffe und Korrosion,* v. 5, no. 10, Oct. 1954, p. 395-398.

Extreme temperature changes, condensation and traces of salt are main problems. 1 ref. (R3)

30-R. (Hungarian.) **Criticism of Potentiometric Measuring as a Research Method for Corrosion.** *Magyar Kémikusok Lapja,* v. 9, no. 10, Oct. 25, 1954, p. 310-314.

Evaluation of method on basis of literature and Hungarian investigations. Electrode potential of corroding metal; factors affecting the electrode potential. 20 ref. (R10)

31-R. Further Tests on the Stability of Analytical Weights in Chemical Laboratories. P. H. Bigg and F. H. Burch. *British Journal of Applied Physics,* v. 5, Nov. 1954, p. 382-386.

Changes in various kinds of weights caused by the corrosive atmospheres of chemical laboratories. Tables. 6 ref. (R3)

32-R. Corrosion Inhibitor Checklist. Maxey Brooke. *Chemical Engineering,* v. 61, Dec. 1954, p. 230, 232, 234.

Table recommends appropriate inhibitor for use with corrosive liquids in contact with representative metals and alloys. Table. 77 ref. (R10)

33-R. Internally-Clad Aluminum Combats Tube Bundle Corrosion. David Stewart and Gordon Weyermuller. *Chemical Processing,* v. 17, Dec. 1954, p. 52-54.

Three refinery problems—their solution and results. Photographs. (R general, Al)

34-R. Cathodic Protection System Eliminates Tank Bottom Failures. Robert Spraul, W. A. Buckner and Gordon Weyermuller. *Chemical Processing,* v. 17, Dec. 1954, p. 62-64.

Rectifier system guards against loss of product and promotes safety. Photographs. (R10, CN)

35-R. Principles of Corrosion. I. Why Metals Corrode. W. H. J. Vernon. *Corrosion Prevention and Control,* v. 1, Nov. 1954, p. 533-538, 546.

Basic principles explained for the nonspecialist. Diagrams, table, graph. (R1)

36-R. The B.N.F. Jet-Test on Organic Bright Nickel Deposits. J. Edwards. *Institute of Metal Finishing, Bulletin,* v. 4, Spring 1954, p. 33-46.

Limitations of method, calibration techniques. Tables, graphs. (R11, L17, Ni)

37-R. Field Investigation of Corrosion in Alkaline Pulping Equipment. C. B. Christiansen and J. B. Lathrop. *Pulp & Paper,* v. 55, Nov. 1954, p. 113-119.

Studies of corrosion variables and remedial measures. Diagrams, graphs. 2 ref. (R5)

38-R. Influence of Exposed Area on Stress-Corrosion Cracking of 24S Aluminum Alloy. William H. Colner and Howard T. Francis. *U. S. National Advisory Committee for Aeronautics, Technical Note* 3292, Nov. 1954, 22 p.

Study of "area effect" for 24S alloy and effects of stress level, degree of sensitivity and hydrogen peroxide concentration. Table, photographs, graphs, diagram, micrographs. 2 ref. (R1, Al)

39-R. (German.) **On the Oxidation of the Intermetallic Compound AlSb by Water.** Werner Rudorff and Ernst Justus Kohlmeyer. *Zeitschrift für Metallkunde,* v. 45, no. 10, Oct. 1954, p. 608-612.

Mechanisms of reactions, reduction of the suboxide. Graphs, tables, micrographs. 8 ref. (R2, Al, Sb)

40-R. (Book.) **Deterioration of Materials. Causes and Preventive Techniques.** Glenn A. Greathouse and Carl J. Wessel, editors. 835 p. 1954. Reinhold Publishing Corp., 430 Park Ave., New York, N. Y. $12.00.

Atmospheric, chemical, and biological deterioration of metals, wood, paper, textiles, plastics, rubber, coatings, and electronic, optical, and photographic equipment. (R general)

41-R. (Book.) **Water Conditioning for Industry.** Sheppard T. Powell. 548

p. 1954. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y.
Water treatment including filtration and purification procedures. Corrosion inhibitors. Embrittlement of boiler steel. (R10, Q23)

42-R. What To Do About Corrosion. Charles Emerson. *American Machinist,* v. 98, Dec. 6, 1954, p. 145-160.
Causes, materials and techniques for control, and prevention. Photographs, diagram. (R general, ST, SS, Mg, Zn, Pb, Sn, Ni, Cr, Fe, Cu, Al)

43-R. New Metal Corrosion Inhibitor. *Chemical Age,* v. 71, Dec. 4, 1954, p. 1183-1184.
Use of cyclohexylamine carbonate (CHC).
(R10, ST, Fe, Al, Cr, Cu, Mg, Zn)

44-R. Corrosion of Aluminum Alloys by Exhaust Gases. Fred M. Reinhart. *Corrosion,* v. 10, Dec. 1954, p. 421.
Damage to aircraft wings which are swept by exhaust gases. Photograph. (R9, Al)

45-R. Nomographs for Making Corrosion Rate Calculations. W. A. Szymanski. *Corrosion,* v. 10, Dec. 1954, p. 422-424.
Easy method of calculating corrosion rates and of converting rates from mg. per day per sq. dm. to in. penetration per yr. Nomogram. (R11)

46-R. Aluminum Alloy Heat Exchangers in the Process Industries. W. W. Binger and H. W. Fritts. *Corrosion,* v. 10, Dec. 1954, p. 425-431.
Factors to consider in selecting materials. Service experience with aluminum in various media. Graphs, table, diagrams, micrograph, photographs. 8 ref.
(R general, T5, Al)

47-R. A Technique for Corrosion Testing in Liquid Lead. John V. Cathcart and William D. Manly. *Corrosion,* v. 10, Dec. 1954, p. 432-434.
Simple apparatus for comparing dynamic corrosion characteristics of various metals. Diagrams, graph, micrographs, photograph. 3 ref.
(R11, Pb)

48-R. A Study of Corrosion and Mass Transfer of Nickel by Molten Sodium Hydroxide. Robert A. Lad and Sidney L. Simon. *Corrosion,* v. 10, Dec. 1954, p. 435-439.
Effects of flow variables, temperature and various additives to metal and caustic. Diagrams, graphs, tables. 2 ref. (R1, Ni)

49-R. Measurement of the Susceptibility of Galvanized Surfaces to Humid Storage Stain. R. A. Neish. *Corrosion,* v. 10, Dec. 1954, p. 440-442.
Evaluation tests. Table, photographs. 11 ref. (R3, CN)

50-R. Carbon Anodes. Robert Pope. *Corrosion,* v. 10, Dec. 1954, p. 443-444.
Advantages of cored rods for cathodic protection. Table.
(R10, ST)

51-R. Tests and Surveys for Lead Sheathed Cables in the Utilities Industry. *Corrosion,* v. 10, Dec. 1954, p. 445-463.
Summary of replies to questionnaire prepared by Task Group 4-B-4 on Tests and Surveys of the NACE. Covers techniques, instrumentation, materials, criteria and operating routines. (R11, R3, Pb)

52-R. A Survey of Corrosion Inhibitors. A. Bukowiecki. *Engineers' Digest,* v. 15, Nov. 1954, p. 476-479. (From *Schweizer Archiv,* v. 20, no. 6. 1954, p. 169-186.)
Previously abstracted from original. See item 361-R, 1954. (R10, ST)

53-R. Fretting Corrosion of Mild Steel in Air and in Nitrogen. I-Ming Feng and Herbert H. Uhlig. *Journal of Applied Mechanics,* v. 21, Dec. 1954, p. 395-400.
Weight loss as measure of damage; effects of time, humidity, temperature, slip, pressure and frequency; nature of corrosion products. Graphs, photographs, table, diagram. 18 ref. (R1, CN)

54-R. Mechanism of Fretting Corrosion. Herbert H. Uhlig. *Journal of Applied Mechanics,* v. 21, Dec. 1954, p. 401-407.
Chemical and mechanical factors involved and outline of remedial measures. Micrograph, diagram, graph, table. 23 ref. (R1, CN)

55-R. Corrosion-Resistant Cast Alloys. E. A. Schoefer. *Machine Design,* v. 26, Dec. 1954, p. 178-186.
A design guide for selecting cast stainless alloys for fabricating characteristics, mechanical properties and cost. Graphs, photographs, tables. 5 ref. (R general, SG-g)

56-R. Corrosion Resistance of Carbo-Nitrided Steel. P. A. Clarkin and M. B. Bever. *Metal Progress,* v. 66, Dec. 1954, p. 108-109.
"Compound layer" in carbonitrided cases reduces the corrosion rate in tepid salt solution to half that of carbonitrided steel without the layer and that of carburized

steel, variously heat treated. Compound layer proved undesirable in sea-water exposure long enough to penetrate the case. Photographs. (R general, J28, CN)

57-R. Air-Corrosion of Fe-Ni-Cr Alloys. Anton deS. Brasunas. *Metal Progress,* v. 66, Dec. 1954, p. 114-B

Nomograph relating corrosion rate, composition and temperature. (R3, R11, Fe, Cr, Ni)

58-R. How Inhibitors Work in Subsurface Corrosion. James D. Crawford and Thomas M. Newell. *World Oil,* v. 139, Dec. 1954, p. 191-193, 196.

Mechanics of corrosion in oil wells and the function of the inhibitors in control. Photographs, graph. (R10, CN)

59-R. (Norwegian.) **Ship and Rust.** Jan Getz. *Teknisk Ukeblad,* v. 101, no. 38, Oct. 21, 1954, p. 823-830; Oct. 28, no. 39, 1954, p. 855-861.

Types and causes of corrosion on ships and evaluation of preventive methods. Photographs, tables, graphs, diagrams. 26 ref. (R3, R4, R10, ST)

60-R. Corrosion of Copper and Copper Alloy Tubes. D. B. Thompson. *Australasian Engineer,* 1954, Oct., p. 48-56; disc., p. 56-59.

Oxide ionization and cupric ion corrosion, the effects of chlorides, sulfates, sulfides, carbon deposits, ashes, internal stress and high rate of water flow, dezincification and other factors contributing to corrosion. Diagrams, micrographs, photographs. 21 ref. (R general, Cu)

61-R. The Effect of Composition on the Scaling of Iron-Chromium-Nickel Alloys Subjected to Cyclic Temperature Conditions. H. L. Eiselstein and E. N. Skinner. Paper from "Symposium on Effect of Cyclic Heating and Stressing on Metals at Elevated Temperatures". ASTM Special Technical Publication No. 165, p. 162-172; disc., p. 172.

Scaling pronounced at 1800° F. for alloys with less than 35% nickel and 20% chromium. Photograph, tables, graphs. (R2, Fe, Cr, Ni)

62-R. (French.) **Theory Relative to the Influence of Hexagonal Elements and Compounds in Polycrystalline Groups.** A. Paudrat. *Métaux, Corrosion-Industries,* v. 29, no. 350, Oct. 1954, p. 372-379.

Sulfonitration and sulfocementation; production of free-cutting steels; decrease of properties of sulfur steels during cooling and heating; fretting corrosion. Diagrams. 34 ref. (R general, J28, G17, ST)

63-R. (Russian.) **The Phenomenon of the Disturbance of the Passive State of Stainless Steels in Strongly Oxidizing Solutions.** N. D. Tomashov and G. P. Chernova. *Doklady Akademii Nauk SSSR,* v. 98, no. 3, Sept. 21, 1954, p. 435-438.

Anodic and cathodic polarization of various steels. Graphs. 10 ref. (R1, R10, SS)

64-R. (Russian.) **Protective Potential of Steel.** N. P. Zhuk. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 10, Oct. 1954, p. 1869-1871.

Mathematical treatment on basis of theory of electrochemical corrosion. 13 ref. (R1, ST)

65-R. Principles of Corrosion. II. Why Metals Corrode. W. H. J. Vernon. *Corrosion Prevention and Control,* v. 1, Dec. 1954, p. 591-600, 639.

Underground and atmospheric corrosion, direct oxidation reactions, distribution of corrosion in or on metals. Micrographs, graphs, diagrams, photograph. 2 ref. (R general)

66-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 77A-78A, 80A.

Cleaning of metallic specimens after exposure. Photograph, table. (R11, Al, Cu, ST, Pb, Mg, Ni, Zn)

67-R. Volatile Rust Inhibitors. Hayward R. Baker. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 2592-2598.

Reaction products of amines with weak acids are most effective at pH of 7.5 to 8.5. Tables. 55 ref. (R10, ST)

68-R. The Weathering of Nickel-Chromium Electrodeposits. W. A. Wesley and B. B. Knapp. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 18, v. 31, 1954, 18 p. + 4 plates.

Chromium on top of nickel helps in early stages of industrial atmosphere exposure but may accelerate pitting in later stages. Effects of metal composition, microstructure and residual stresses on type of pitting. Tables, photographs, micrographs. 8 ref. (R3, R2, Ni, Cr)

69-R. The Resistance of Some Cast and Plated Sleeve-Bearing Materials to Cavitation Erosion. R. A. Schaefer, J. F. Cerness and H. A. Thomas. *Institute of Metal Finishing, Transactions, Advance Copy, no.* 26, v. 31, 1954, 10 p. + 2 plates.

Tests using high-frequency vibration in oil show silver-2% lead and 74-10-16 copper-tin-lead have promise for high-speed sleeve bearings at high temperatures. Diagrams, tables, photographs, graph. 17 ref. (R2, T7, Ag, Pb, Cu, Sn)

70-R. Corrosion-Fatigue Properties of an Aluminium-Magnesium-Silicon Alloy in the Unprotected, Anodized, and Painted Conditions. N. P. Inglis and E. C. Larke. *Institute of Metals, Journal,* v. 83, Dec. 1954, p. 117-120 + 1 plate.

Effects of tap water and 3% sodium chloride solution. Careful painting gave extremely effective protection. Tables, graphs, diagram, photographs, micrograph. 6 ref. (R1, L26, Al)

71-R. External Exchangers Stem Chemical and Electrolytic Corrosion. Carl Buck. *Iron Age,* v. 174, Dec. 30, 1954, p. 50-51.

Heat exchangers for cleaning, plating and pickling tanks. Photographs, table. (R5, L10)

72-R. Anti-Corrosion Practice for Wrought Aluminum Alloys. M. J. Pryor. *Light Metal Age,* v. 11, Dec. 1954, p. 18-21, 33, 41, 46.

Formation and characteristics of oxide films; forms of corrosion; effects of alloy additions. Photographs, micrograph. (R general, Al)

73-R. (German.) **Cathodic Protection of Pipe Lines. II. Use of Cathodic Protection Against Corrosion in Underground Pipe Lines.** H. Steinrath. *Erdöl und Kohle,* v. 7, no. 11, Nov. 1954, p. 728-730.

Equipment used; illustrates layout. Diagrams, table, photograph. 15 ref. (R10, R8)

74-R. (German.) **Cathodic Protection as a Measure Against Corrosion.** *Gas- und Wasserfach, Bau und Betrieb,* v. 6, no. 8, Nov. 1954, p. 45-47.

Practical suggestions on designing a cathodic device for protecting water mains. Graphs, diagrams. (R10, CN)

75-R. (Italian.) **Distribution of Attack, Voltage, and Currents in Corrosion by Differential Aeration. Research on Zinc.** G. Bianchi and R. Aletti. *Metallurgia italiana, v.* 46, no. 10, Oct. 1954, p. 347-353.

Use of aeration curves and a mathematical model permit calculation of current distributions for various corrosion conditions. Diagrams, graphs, tables. 9 ref. (R10, Zn)

76-R. (Russian.) **Mechanism of the Overpassivation of Steels in Oxidizing Media.** V. P. Batrakov. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 97-100.

Anodic and cathodic polarization. Mathematical formulas. Graphs. 8 ref. (R10, ST)

77-R. (Russian.) **Anodic Passivation of Iron in Concentrated Sulfuric Acid.** V. M. Novakovskii and A. I. Levin. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 129-132.

Effects of acid concentration and current density on passivation behavior. Diagram, graphs. 9 ref. (R10, R6, Fe)

78-R. (Russian.) **Rate of Oxygen Depolarization in the Atmospheric Corrosion of Metals.** I. L. Rozenfel'd and K. A. Zhigalova. *Doklady Akademii Nauk SSSR,* v. 99, no. 1, Nov. 1, 1954, p. 137-140.

Relation of copper cathode potential to amount of electricity passed at various relative humidities. Graphs. 9 ref. (R3)

79-R. (Russian.) **Irreversible Potentials and Corrosion Behavior of Manganese.** A. Ia. Shatalov and N. I. Isaev. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 9, Sept. 1954, p. 1562-1571.

Investigates mechanism of manganese corrosion at different pH's, using the method of polarization diagrams. Diagrams, tables. 17 ref. (R11, Mn)

80-R. (Book.) **Corrosion Problems and Prevention in the Chemical and Petro-Chemicals Industries in the U.S.A.** (Technical Assistance Mission No. 130) 129 p., 1954. Organisation for European Economic Co-Operation, 2, rue André-Pascal, Paris-16e, France. $1.50.

Corrosion theory, methods of study, anticorrosive materials, protective coatings, inhibitors, and cathodic protection. (R general, L general)

81-R. Lead Lined Plus. *Chemical Engineering,* v. 62, Jan. 1955, p. 230, 232.

Anticorrosive film on lead liner protected by carbon or graphite layer. Photograph. (R10, Pb)

82-R. Reaction of Thallium With Oxygen and Moisture. J. T. Waber and G. E. Sturdy. *Electrochemical Society, Journal,* v. 101, Dec. 1954, p. 583-589.

Investigations in the range 25-75° C. to throw light on mechanism of atmospheric corrosion. X-ray diffraction confirms principal reaction product changes from Tl_2O to TlOH. Graphs, tables. 13 ref. (R3, M22, Tl)

83-R. Oxidation of Iron-Molybdenum and Nickel-Molybdenum Alloys. S. S. Brenner. *Electrochemical Society, Journal,* v. 102, Jan. 1955, p. 7-15.

Alloys do not exhibit "catastrophic oxidation" up to 1000° C. in either stationary or flowing atmospheres. Graphs, tables, micrographs. 13 ref. (R2, Fe, Mo, Ni)

84-R. Catastrophic Oxidation of Some Molybdenum-Containing Alloys.

S. S. Brenner. *Electrochemical Society, Journal,* v. 102, Jan. 1955, p. 16-21.
Nickel or chromium cause rapid attack when added to binary iron-molybdenum alloys. Table, graphs, micrographs, photographs. 6 ref. (R2, Ni, Fe, Mo, Cr)

85-R. Corrosion of Titanium in Fused Chlorides. Formation of Pyrosols. C. B. Gill, M. E. Straumanis and A. W. Schlechten. *Electrochemical Society, Journal,* v. 102, Jan. 1955, p. 42-45.
Shows severe attack when immersed in molten alkali chloride bath in presence of air. Photographs, tables. 11 ref. (R6, Ti)

86-R. Hydrogen Blisters. Felipe Paredes and W. W. Mize. *Gas,* v. 30, Dec. 1954, p. 89-92.
Causes and methods of prevention in pipe lines. Photographs, diagrams, tables, map. 10 ref. (R2, ST)

87-R. Metal Materials for Handling Aqueous Hydrofluoric Acid. Mortimer Schussler. *Industrial and Engineering Chemistry,* v. 47, Jan. 1955, p. 133-139.
Behavior of several fabricated alloys. Welds at air-liquid interfaces are quite vulnerable. Tables, micrographs, photographs. 7 ref. (R5)

88-R. Corrosion in the Petroleum Industry. III. F. H. Garner and A. R. Hale. *Petroleum,* v. 18, Jan. 1955, p. 12-14.
Methods for testing corroded parts. Photographs. 24 ref. (R7, CN, Ni, AY, SS, CI)

89-R. Corrosion Prevention in Cooling Water Heat Exchangers. J. D. Munro. *Petroleum Engineer (Management Ed.),* v. 27, Jan. 1955, p. C35 + 11 pages.
Photographs, tables, diagrams. 6 ref. (R4)

90-R. Guard Your H-P Boilers Against These Forms of Corrosion. *Power,* v. 99, Jan. 1955, p. 90-93.
Appearance, location and cause of corrosion resulting in internal and external deterioration. Photographs, diagrams, table, micrograph. (R1, R4, ST)

91-R. Stop Losing Your Heating-System Dollars to Corrosion. *Power,* v. 99, Jan. 1955, p. 118-119.
Proper water treatment and a tight system slow down internal corrosion losses, care in pipe laying checks external attack. Oxygen and carbon dioxide are biggest trouble makers. Table. (R4, R10, ST)

92-R. (French.) **Problems Raised by the Combustion of Heavy Fuels in Gas Turbines.** Peter Sulzer. *Revue universelle des mines,* v. 10, ser. 9, no. 12, Dec. 1954, p. 715-724.
Deposit formation; corrosion of steels under the effect of ashes; remedies. Photographs, diagrams, graph, table. (R7, ST)

93-R. (German.) **The Effect of Organic Inhibitors on the Dissolving of Iron in Acids.** J. Elze. *Metalloberfläche,* Ausgabe A, v. 8, no. 12, Dec. 1954. p. 177-179.
Investigations with a redox electrode; effect of inhibitors in the presence of an oxidizing agent. Tables, graphs. 8 ref. (R10, Fe)

94-R. (German.) **The Initial Corrosion of Metals in Contact With Aqueous Solutions at Room Temperatures.** Fritz Tödt. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 430-433; disc., p. 433.
Differentiates between two types and in both cases it is assumed that a local element is formed, which can be verified by evidences of coating. Tables. 10 ref. (R5, Al. Fe)

95-R. (German.) **The Application of Electrochemical Methods to the Investigation of Corrosion.** Marcel Pourbaix. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 433-440; disc., p. 440.
Series of electrochemical equilibrium diagrams predict extent of metal corrosion. Polarization curves give information on appropriate protective measures to be taken. Diagrams, graphs, circuit diagrams. 25 ref. (R11, Fe, ST)

96-R. (German.) **The Protection of Steel Constructional Work From Corrosion.** Karl Krenkler. *Werkstoffe und Korrosion,* v. 5, no. 11, Nov. 1954, p. 441-451.
Conditions promoting rust formation; cleaning and treatment of metal surfaces; application factors of protective coatings; selection of proper anticorrosive paints. Photographs, diagrams, graphs. 4 ref. (R3, L26, Fe)

97-R. A Natural Inhibitor of Pitting Corrosion of Copper in Tap-Waters. Hector S. Campbell. *Journal of Applied Chemistry,* v. 4, Dec. 1954, p. 633-647.
An unidentified, apparently organic inhibitor with a bluish-white fluorescence. Tables, graphs, diagrams, photographs, circuit diagrams, polarograms. 8 ref. (R10, R4, Cu)

98-R. Corrosion Due to Mud Banks in River Estuaries. W. S. Patterson. *Journal of Applied Chemistry,* v. 4, Dec. 1954, p. 661-666.

Examines abrasion on paints, anaerobic corrosion, water-line corrosion and sulfide concentrations. Graphs, tables. 8 ref. (R8, Fe)

99-R. Laboratory Studies on the Use of Coal-Tar Bases as Inhibitors of Corrosion by Flue Gases. R. W. Kear. *Journal of Applied Chemistry,* v. 4, Dec. 1954, p. 674-679.

Bases sprayed into gas streams reduced corrosion by SO_3 so long as it was below the dew point (136° C.). Diagram, graphs. 9 ref. (R10, ST)

100-R. (German.) **Corrosion and Corrosion Protection of Underground Petroleum Tanks.** Hugo Kiemstedt. *Erdöl und Kohle,* v. 7, no. 12, Dec. 1954, p. 833-835.

Various causes of corrosion of inside tank wall and the cement-coating process as an effective protection against rust. Diagrams. 7 ref. (R7, R10, Fe)

101-R. (Italian.) **The Behavior of Aluminum Exposed for Long Periods to a City Atmosphere.** C. Panseri and A. Gragnani. *Alluminio,* v. 23, no. 6, Dec. 1954, p. 627-637.

Chemical analysis and mechanical and micrographical tests of samples of 50-yr. old low-purity roofing sheets shows excellent behavior with pitting of corroded zones held below 0.1 mm. Photographs, micrographs, tables. 6 ref. (R3, Al)

102-R. (Italian.) **Aluminum-Graphite Galvanic Couple in Light-Alloy Corrosion.** A. Prati. *Alluminio,* v. 23, no. 6, Dec. 1954, p. 639-649.

Results of corrosion tests made on Raffinal alloy and short-circuited with graphite. Micrographs, photographs, tables, graphs, diagrams. 7 ref. (R11, Al)

103-R. (Russian.) **Corrosion of Stainless Steels in Acidic Oxidizing Solutions. New Types of Corrosion Failure of Weld Joints.** M. M. Kurtepov. *Doklady Akademii Nauk SSSR,* v. 99, no. 2, Nov. 11, 1954, p. 305-306 + 1 plate.

Cites a particular case of intercrystalline corrosion of 18-8 type steel between solid metal and the weld seam. Micrographs. 3 ref. (R5, K general, SS)

104-R. (Russian.) **Mechanism of Self-Passivation of Metals in Oxidizing Media.** V. P. Batrakov. *Doklady Akademii Nauk SSSR,* v. 99, no. 5, Dec. 11, 1954, p. 797-800.

Expanded electrochemical treatment; relative importance of various factors. Graphs. 6 ref. (R10)

105-R. (Russian.) **Corrosion of Steels by Hot Alkaline Solutions Under Pressure.** Kh. L. Tseitlin, N. K. Kurcheninova, S. M. Babitskaia and A. A. Babakov. *Khimicheskaia Promyshlennost,* 1954, no. 7, Oct.-Nov., p. 438-440.

Stainless steels in unstressed state are more resistant to corrosion but less resistant to formation of cracks than low-carbon steels in stressed state. Tables. (R5, SS, AY, Cr, Ni, Mo)

106-R. The Five Per Cent Salt Spray Test and Its Acetic Acid Modification. Wardley D. McMaster. *ASTM Bulletin,* 1955, no. 203, Jan., p. 62-69.

Salt spray quickly compares quality and thickness of various coatings for metal; acetic acid further accelerates test; 95° F. is best temperature. Tables, photographs, graph. 17 ref. (R11)

107-R. Corralling Corrosive Chemicals. *INCO,* v. 26, Jan. 1955, p. 26-29.

Use of nickel alloy valves in chemical and petroleum industries. Photographs, diagrams. (R general, T29, Ni)

108-R. Cathodic Protection. Morris Mote. *Mines Magazine,* v. 44, Dec. 1954, p. 35-38, 42.

In order to fulfill the requirement that design of a structure should include corrosion prevention, the use of cathodic as well as anodic protection is rapidly expanding. 10 ref. (R10, ST)

109-R. (English.) **The Mechanism of Oxidation of Metals From the Viewpoint of the Transition State Theory.** E. A. Gulbransen. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola, p. 899-907; disc., p. 907-908.

Theoretical explanation of the wide variations in experimental values of entropy and heat of activation for 13 metals. Graphs, table. 13 ref. (R2)

110-R. (German.) **The Attack of Iron-Saturated Zinc Melts on Silicon-Containing Iron.** Dietrich Horstmann. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 527-533.

Corrosive effect of zinc saturated with iron on iron-silicon alloys as a function of silicon content and temperature. Tables, graphs, micrographs. 8 ref. (R6, Fe, Si)

111-R. (German.) **Corrosion and Protection Against Corrosion in the Telecommunications Construction Industry.** H. Lorke. *Nachrichtentechnik,* v. 4, no. 11, Nov. 1954, p. 494-498.

Types of corrosion; metallic and nonmetallic protective coatings; inspection and care of telecommunication lines. Diagrams, photographs. 12 ref.
(R general, L general, T1, Fe, ST)

112-R. (German.) **Application of the Theory of Disorder Phenomena in Heterogeneous Solid Solutions to the Development of Non-Scaling Metal Alloys.** Karl Hauffe. Paper from "International Symposium on the Reactivity of Solids, Gothenburg 1952, Proceedings". Ingeniörsvetenskapsakademien and Chalmers Tekniska Högskola. p. 823-844; disc., p. 844-845.

Role of diffusion processes in oxide layer formation. Graphs. 38 ref. (R2, N10)

113-R. (Polish.) **Corrosion of Steel in Molten Salts and Alkali at 475 to 500° C.** H. Jodko and M. Wiekiera. *Przemys Chemiczny,* v. 10, no. 12, Dec. 1954, p. 593-599.

Attack on carbon, stainless, and chromium-aluminum - silicon - molybdenum steels by three common salt mixtures used as heat transfer media. Tables, photographs, graphs. 7 ref. (R6, ST)

114-R. (Russian.) **Possible Mechanism of Fracture of a Metal in a Corrosive Medium.** Iu. N. Rabotnov. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 6, June, p. 53-56.

Mathematical investigation of stress corrosion. Graph. 1 ref. (R1)

115-R. (Russian.) **Electroreducing Processes on Oxidized Steel. I. Electroreduction of Oxygen.** A. S. Afanas'ev and E. N. Chankova. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 11, Nov. 1954, p. 1975-1986.

Cathode polarization curves for etched steel and steel covered by four types of oxides; significance of current density and other factors; numerical values for Tofel's formulas. Graphs, tables. 8 ref. (R2, ST)

116-R. Galvanic Corrosion in Underground Steel. T. R. B. Watson. *Canadian Metals,* v. 18, Feb. 1955, p. 18-20.

Fundamentals of corrosion; role of electricity in corrosion; prevention practices. Diagrams. (R1, CN)

117-R. Resurgent Corrosion Fighter. *Chemical Engineering,* v. 62, Feb. 1955, p. 140-142.

Solvay re-examines sodium nitrite's properties as a corrosion inhibitor, boost sales many fold in less than 5 yr. Photograph. (R10)

118-R. Catastrophic Corrosion Resulting From Vanadium Pentoxide in Fuel Oil Ash. Anton deS. Brasunas. *Corrosion,* v. 11, Jan. 1955, p. 17-18.

Relative merits of nickel-rich and nickel-free alloys for gas turbines, boiler tubes and burners. Sources of vanadium in fuel oils; effects of additives. Diagrams, photographs. 10 ref. (R7, Ni)

119-R. Laboratory Evaluation of Inhibitors for Sweet Gas-Condensate Wells. P. J. Raifsnider, R. S. Treseder and Aaron Wachter. *Corrosion,* v. 11, Jan. 1955, p. 19-21.

Good correlation of screening tests and field trial experience. Photograph, diagram, tables. 1 ref. (R10)

120-R. Effect of Minor Constituents on the Intergranular Corrosion of Austenitic Stainless Steels. J. J. Heger and J. L. Hamilton. *Corrosion,* v. 11, Jan. 1955, p. 22-26.

Metallographic tests indicate precipitation of minor elements at grain boundaries in cause of failure of steels with less than 0.02% carbon. Graphs, micrographs. 3 ref. (R2, SS)

121-R. Effect of Design, Fabrication and Installation on the Performance of Stainless Steel Equipment. James A. Collins. *Corrosion,* v. 11, Jan. 1955, p. 27-34; disc., p. 34.

Prevention of concentration-cell, stress-corrosion and thermal fatigue of chemical process equipment. Table, diagrams, photographs, micrographs. 9 ref. (R1, Q7, SS)

122-R. Corrosion Aspects of the Vanadium Problem in Gas Turbines. S. H. Frederick and T. F. Eden. *Corrosion,* v. 11, Jan. 1955, p. 35-45; disc., p. 45-49.

Effects of vanadium pentoxide and mixtures of it with sodium sulfate on heat resisting materials; benefits of additives in the fuel oil. Tables, micrographs, photographs, graphs, 11 ref. (R9, SG-h)

123-R. Notes on a System for Rating Pitting Corrosion. Russell W. Henke. *Corrosion,* v. 11, Jan. 1955, p. 50-52.

System uses a 10-digit number to describe depth, diameter, area, nature of pit walls and time of exposure. Photograph, diagrams. (R2)

124-R. Cathodic Protection of Open Box Coolers, J. P. H. Zutphen. *Corrosion,* v. 11, Jan. 1955, p. 53-56.

Use of graphite anodes to protect exterior surfaces of steel tubes used to cool ammonia gas. Tubes were exposed to brackish sea water. Diagrams, graphs.
(R10, R4, ST)

125-R. Important Advantages of Titanium in the Chemical Industry. W. G. Renshaw and Perry R. Bish. *Corrosion,* v. 11, Jan. 1955, p. 57-62; disc., p. 62-63.

Unusual passivity under certain severe conditions is leading to increased use in chemical equipment. Explanation of behavior in dry halogens. Graphs. 11 ref.
(R6, T29, Ti)

126-R. Use of Organic Inhibitors in Refinery Distillation Process Equipment. G. E. Purdy. *Corrosion,* v. 11, Jan. 1955, p. 64-67.

Recommendations for reducing losses due to attack by hydrogen sulfide, hydrochloric acid, organic acids and salts. Graph, table, photographs. (R10)

127-R. A Technique for Installing Carbon Anodes in Cable Ducts. Edward J. Doyle. *Corrosion,* v. 11, Feb. 1955, p. 17-18.

Development and use of graphite anodes in cathodic protection of underground cables. Diagram, photographs. (R10, Pb)

128-R. Use of High Molecular Weight Corrosion Inhibitors in Petroleum Refineries. H. Howard Bennett. *Corrosion,* v. 11, Feb. 1955, p. 19-26; disc., p. 26-27.

Evaluation procedures. Results of 2-yr. test program. Photographs, diagrams, graphs, tables. (R10)

129-R. A New Method for Measuring Potentials of Polarized Electrodes in Soil Corrosion Cells. W. Neighbours. *Corrosion,* v. 11, Feb. 1955, p. 28-30.

Method of interrupting current through a soil corrosion cell and of measuring potentials of the polarized electrodes during period of interruption. Diagrams, photographs. 3 ref. (R8)

130-R. Corrosion and Erosion-Corrosion of Some Metals and Alloys by Strong Nitric Acid. J. F. Willging, J. P. Hirth, F. H. Beck and M. G. Fontana. *Corrosion,* v. 11, Feb. 1955, p.31-39.

Stainless steels and aluminum alloys were tested in the temperature range of room temperature to 160° F. Diagrams, photographs, graphs, tables. 15 ref. (R5, Al, SS)

131-R. Proposed Methods for Cathodic Protection of Composite Structures. M. Unz. *Corrosion,* v. 11, Feb. 1955, p. 40-43.

Analysis of drainage, blocking and rectifier circuits. Examples. Diagrams. 2 ref. (R10)

132-R. Corrosion of Aircraft Structural Materials by Agricultural Chemicals. I. Laboratory Tests With Fertilizer Compounds. T. Marshall and L. G. Neubauer. *Corrosion,* v. 11, Feb. 1955, p. 44-52.

Studies of corrosion during aerial application of chemicals. Preventive measures. Tables, photograph, micrographs. 7 ref. (R6, CN, Al, Mg)

133-R. Some Remarks on Stress Corrosion Testing. Hugh P. Godard and J. J. Harwood. *Corrosion,* v. 11, Feb. 1955, p. 53-58.

Influence of specimen and test environment factors on results. Graphs, photographs, diagram. 33 ref. (R1)

134-R. Tentative Standard Method for Measuring Electrical Conductance of Coating on Buried Pipe Lines. *Corrosion,* v. 11, Feb. 1955, p. 59-62.

Definitions, test conditions and set up, instruments, procedures, calculations and methods of reporting results. Diagrams, graphs. 3 ref.
(R8, R11, P15, CN)

135-R. Principles of Corrosion. III. Prevention of Corrosion. W. H. J. Vernon. *Corrosion Prevention and Control,* v. 2, Jan. 1955, p. 19-28, 44.

General review of methods based on modifications of design, materials or environment. Diagrams, table, graphs. (R general)

136-R. Corrosion of Tinplate by Foods Packed in Cans. I. Denis Dickinson. *Corrosion Technology,* v. 2, Jan. 1955, p. 4-7.

Effects of fabrication and canning procedures; effect of coating thickness on storage life. Photographs, diagrams, 6 ref. (To be concluded.) (R7, Sn)

137-R. Polarization Studies of Copper, Nickel, Titanium, and Some Copper and Nickel Alloys in Three Per Cent Sodium Chloride. H. B. Bomberger, F. H. Beck and M. G. Fontana. *Electrochemical Society, Journal,* v. 102, Feb. 1955, p. 53-58.

Relationships between potential, time, current, corrosion rate and solution velocity. Diagram, tables, graphs. 11 ref. (R11, Cu, Ni, Ti)

138-R. Effect of Oxygen, Chlorides, and Calcium Ion on Corrosion Inhibition of Iron by Polyphosphates. H. H. Uhlig, D. N. Triadis and M. Stern. *Electrochemical Society, Journal,* v. 102, Feb. 1955, p. 59-66.

Corrosion data indicate that sodium polyphosphates inhibit by favoring passivation by absorbed oxygen. A critical supply of oxygen is required. Diagram, graphs, table. 24 ref. (R10, ST)

139-R. The Crystallographic Dependence of the Oxidation Potential of Solid Copper. W. E. Tragert and W. D. Robertson. *Electrochemical Society, Journal,* v. 102, Feb. 1955, p. 86-94.

Dependence of oxidation potentials on various crystallographic planes exposed to the active medium. Tables, graphs. 26 ref. (R2, Cu)

140-R. The Corrosion of Tin by Aqueous Solutions of Ammonia. S. C. Britton and D. G. Michael. *Journal of Applied Chemistry,* v. 5, Jan. 1955, p. 1-9.

Conditions for prevention of attack; inhibitor additions. Tables, graph. 5 ref. (R5, R10, Sn)

141-R. The Corrosion of Tin in Solutions of Sodium Alkyl Sulphates. T. K. Roos. *Journal of Applied Chemistry,* v. 5, Jan. 1955, p. 10-18.

Mechanism of pitting corrosion in solutions containing surface active agents. Graphs, micrographs. 22 ref. (R2, R5, Sn)

142-R. Give Corrosion a Run for Your Money. *Steel,* v. 136, Jan. 24, 1955, p. 74-75.

Corrosion resistance of zirconium. Photographs. (R general, Zr)

143-R. Attack of Iron-Saturated Molten Zinc on Iron. D. Horstmann. *Henry Brutcher Translation no.* 3355, 15 p. Henry Brutcher, Altadena, Calif. (Slightly abridged from *Stahl und Eisen,* v. 73, no. 10, 1953, p. 659-665.)

Previously abstracted from original. See item 275-R, 1953. (R6, L16, Fe, Zn)

144-R. (French.) **Optical Study and Continuous Recording of the Corrosion of Silver by Iodine Vapor.** Georges Colange and René Dubrisay. *Comptes rendus,* v. 239, no. 23, Dec. 8, 1954, p. 1629-1631.

Hypothesis concerning the difference between the first and the subsequently formed corrosion rings. Photographs. 4 ref. (R6, Ag)

145-R. (French.) **Mechanism of Anodic Attack of Copper.** René Audubert. *Comptes rendus,* v. 239, no. 25, Dec. 20, 1954, p. 1792-1795.

Kinetic theory of overvoltage makes it possible to explain the mechanism of anodic dissolution of copper in an acid medium. Graphs. 2 ref. (R1, Cu)

146-R. (German.) **Fretting Corrosion as a Cause of Fracture of Shrunk-On Crankshafts of Large Piston Engines.** Franz Jaklitsch. *Stahl und Eisen,* v. 75, no. 2, Jan. 27, 1955, p. 97-98.

Reduction of fatigue strength by combined abrasion and corrosion. Table, photographs. 3 ref. (R1, Q7, ST)

147-R. (Italian.) **Study of Metallic Oxidation by Change of Weight. IV. Copper-Zinc Alloys.** N. Collari and P. Spinedi. *Metallurgia italiana,* v. 46, no. 11, Nov. 1954, p. 403-409.

Weight-time curves were used to determine relationship between composition and oxidation of several alloys. Graphs. 19 ref. (R2, Cu, Zn)

148-R. (Italian.) **Hot Oxidation of Iron.** V. Montoro. *Metallurgia italiana,* v. 46, no. 11, Nov, 1954, p. 410-412.

Two types of behavior noted as function of temperature. Analysis does not allow for phase changes. Graph. 4 ref. (R2, Fe)

149-R. Principles of Corrosion. IV. Prevention of Corrosion. W. H. J. Vernon. *Corrosion Prevention and Control,* 2, Feb. 1955, p. 21-29.

Resistance improved by purifying and alloying. Coatings of reaction product, organics, inorganics and metals for control. Table, graphs, diagram. 10 ref. (R general, L general)

150-R. Oxidation of Cobalt Metal. R. E. Carter, F. D. Richardson and C. Wagner. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Feb. 1955, p. 336-343.

Oxidation occurs by outward diffusion of cobalt through the oxide. Calculated and measured oxidation rates are in agreement. Tables, photograph, graphs, micrograph. 17 ref. (R2, Co)

151-R. Controlling Corrosion in Aluminum Fabrication. II. M. J. Pryor. *Light Metal Age,* v. 12, Feb. 1955, p. 13-16, 33.

Design considerations for avoiding conditions leading to corrosion damage. Diagrams. (R general, Al)

152-R. Oil Refineries and Corrosion by Water. Methods of Prevention. P. W. Sherwood. *Petroleum,* v. 18, Feb. 1955, p. 50-53.

Three principal variables determine the degree of corrosiveness where attack by water is involved and six major methods are recognized for its control. (R4, ST)

153-R. Protect Steel Tanks From Corrosion. Harry J. Keeling. *Petro-*

leum Refiner, v. 34, Feb. 1955, p. 140-142.

Corrosion can virtually be eliminated by insulating metal with protective coating or applying cathodic protection current to submerged metal. Photographs, diagram. (R10, L general, Pt, Fe, Al, Mg)

154-R. (English.) **Corrosion of Metals by Acid River Water. I. Theoretical Consideration of Corrosion of Iron and Steel.** Saburo Shimodaira. *Science Reports of the Research Institutes, Tohoku University,* ser. A, v. 6, no. 5, Oct. 1954, p. 431-445.

Determination of rate and type of corrosion by stagnant and flowing water. Tables, graphs. 21 ref. (R4, Fe, CN)

155-R. (French.) **Sea Water Corrosion of Steel Pieces.** G. Dechaux and E. Segol. *Métaux, Corrosion-Industries,* v. 29, no. 352, Dec. 1954, p. 469-482.

Experimental data on the functioning of corrosion cells in an alkaline and aerated medium. Photographs, micrographs, graphs. (R4, ST)

156-R. (German.) **Corrosion Studies. I. Polarographic Observation of Metal Corrosion.** I. Sekerka and J. Vorlicek. *Collection of Czechoslovak Chemical Communications,* v. 19, no. 6, Dec. 1954, p. 1335-1338.

Data do not agree with Van Rysselberghe's observations. Graphs, oscillograms. 5 ref. (R11)

157-R. (German.) **Inter and Transcrystalline Corrosion and Its Testing.** Friedrich-Carl Althof. *Metall,* v. 9, nos. 3-4, Feb. 1955, p. 110-120.

Principles of testing, description and evaluation of different types of test, resistance of different ferrous and nonferrous metals and alloys to inter and transcrystalline corrosion. Diagrams, graphs, photograph, tables. 36 ref. (R11, ST, EG-a)

158-R. (German.) **Solid Products of Corrosion as Corrosion-Governing Elements.** W. Feitknecht. *Werkstoffe und Korrosion,* v. 6, no. 1, Jan. 1955, p. 15-26.

Detailed results show manner in which solid products govern the whole corrosion process according to their constitution, formation and dispersal. Micrographs, tables, graphs, diagrams, X-ray diagram. 26 ref. (R general, Zn)

159-R. (German.) **Inhibition and Inhibitors.** Hellmuth Fischer. *Werkstoffe und Korrosion,* v. 6, no. 1, Jan. 1955, p. 26-31; disc., p. 31-32.

Mechanism of physical and chemical inhibition, its existence and use. Tables, diagrams. 10 ref. (R10)

160-R. (Russian.) **Kinetics of Intercrystalline Corrosion of Chromium-Nickel Stainless Steels.** V. Sh. Shekhtman, M. A. Vedeneeva and N. P. Zhuk. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 12, Dec. 1954, p. 2199-2210 + 1 plate.

Effects of heat treatment, composition and concentration of corrosion medium, cold working and trace-element content of steel. Special electrical method of investigation. Graphs, micrographs, diagrams, tables. 18 ref. (R2, SS)

161-R. (Russian.) **Use of Fe^{59} for Investigating the Mechanism of Iron Oxidation.** B. V. Linchevskii and N. P. Zhuk. *Zhurnal Fizicheskoi Khimii,* v. 28, no. 12, Dec. 1954, p. 2265-2267.

Experimental data on distribution of activity in iron scale. Graphs, table. 5 ref. (R2, Fe)

162-R. **Corrosion of Ships.** A. Pickworth. *Corrosion Technology,* v. 2, Feb. 1955, p. 32-36.

Causes, protective measures, design features. Photographs. (R general, CN)

163-R. **Minimizing Stress Corrosion Cracking of Cylinder Valves.** Mortimer Schussler. *Corrosion,* v. 11, Mar. 1955, p. 105-108.

Corrosion tests on forged aluminum bronze valve bonnets. Design considerations. Remedial measures. Micrographs, photographs, diagrams, tables. (R1, Cu)

164-R. **Corrosion Evaluation of Ship Bulkhead and Hull Plating by Audigage Thickness Measurements.** Dwight J. Evans. *Corrosion,* v. 11, Mar. 1955, p. 109-113; disc., p. 113-114.

Audigage equipment and operating procedures. Photograph, diagram, tables. (R general, S14)

165-R. **Corrosion of Aircraft Structural Materials by Agricultural Chemicals. II. Effect of Insecticides, Herbicides, Fungicides and Fertilizers.** Charles F. Schreiber. *Corrosion,* v. 11, Mar. 1955, p. 119-130.

Corrosive and surface destruction effects of generally used agricultural chemicals on structural materials and finishes used in agricultural aircraft and dispersing equipment. Tables. (R6)

166-R. **Solution of Cathodic Protection Interference Problems.** Francis W. Ringer. *Corrosion,* v. 11, Mar. 1955, p. 131-138.

Determining the extent of possible interference of underground protection devices on neighboring structures which are not primarily con-

sidered as being a part of the cathodic protection system. Table. 3 ref. (R10)

167-R. Cathodic Protection Applied to a Large-Diameter Oil Pipe Line System. Dean O. Griffith. *Corrosion,* v. 11, Mar. 1955, p. 139-142.
Equipment and operation techniques. Photographs, diagrams. (R10)

168-R. Proposed Standardized Laboratory Procedure for Screening Corrosion Inhibitors for Use in Oil and Gas Wells. *Corrosion,* v. 11, Mar. 1955, p. 143-146.
A static oil and water immersion test using the weight loss of a steel coupon when under the influence of an inhibited system compared to its weight loss under an unhibited system. Table, diagram. (R10)

169-R. Localised Corrosion in Steam Boilers. I. R. N. Parkins. *Corrosion Technology,* v. 2, Feb. 1955, p. 43-46.
Types of pitting corrosion. Graphs, photographs. 10 ref. (R2)

170-R. Cathodic Protection of Underground Structures. I. W. Godfrey Waite. *Corrosion Technology,* v. 2, Feb. 1955, p. 47-49.
Theory, methods. Diagrams. (R10)

171-R. Corrosion of Tinplate by Foods Packed in Cans. II. Denis Dickinson. *Corrosion Technology,* v. 2, Feb. 1955, p. 49-51.
Corrosive effects of different fruits and vegetables. Effects of trace elements in the form of spray residues. Importance of lacquers. Table, photograph, 10 ref. (R7)

172-R. Here Is Why Pipe Lines Corrode. Maurice A. Riordan. *Pipe Line Industry,* v. 2, Mar. 1955, p. 36-39.
Corrosion mechanisms; evaluation of corrosion circuits. Diagrams. (R general)

173-R. How to Combat Internal Corrosion. Russell A. Brannon. *Pipe Line Industry,* v. 2, Mar. 1955, p. 44-49.
Corrosion protection by means of coatings and inhibitors. Photographs, diagrams, table. (R10, L general)

174-R. How to Design Cathodic Protection Systems. Wayne A. Johnson. *Pipe Line Industry,* v. 2, Mar. 1955, p. 58-60, 64.
Soil and current requirements, equipment tests and selection. Photographs, diagrams, graph. (R10)

175-R. Field Investigation of Corrosion in Alkaline Pulping Equipment. C. B. Christiansen and J. B. Lathrop. *Tappi,* v. 38, Feb. 1955, p. 122-128.
Forces which cause corrosion in digesters, recommendations for extending service life of alkaline pulping equipment. Diagrams, graphs, table. (R5)

176-R. (English.) **Effect of Electric Field on Oxidation of Copper.** H. H. Uhlig and A. E. Brenner. *Acta Metallurgica,* v. 3, no. 1, Jan. 1955, p. 108-109.
Within experimental error no effects of field strengths up to 15,500 v. observed. Graph, table. 3 ref. (R2, Cu)

177-R. (Pamphlet.) **The Action of Polar Organic Inhibitors in the Acid Dissolution of Metals.** University of Texas. PB 111451, 1953, 18 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.50.
Exact mechanism of inhibition. Experimental data confirm the theory. (R10)

178-R. (Book—Dutch.) **Corrosion Tests With Aluminum Alloys.** E. M. J. Mulders, W. G. R. deJager, and J. W. Boon. Pt. I-II. 63 p. 1954. Nijverheidsorganisatie voor Toegepast Natuurwetenschappelijk Onderzoek, The Netherlands.
Mechanical and chemical properties of specimens joined by various methods and of the alloys joined with steel which have been subjected to exposure and accelerated laboratory tests. (R11, Q general, Al, ST)

179-R. (Russian.) **Zero Charge Potential and Action Mechanism of Inhibitors of Acidic Corrosion of Iron.** E. O. Aiazian. *Doklady Akademii Nauk SSSR,* v. 100, no. 3, June 21, 1955, p. 473-476.
Cathode polarization curves of iron; relation of double layer capacity to the potential on iron in sulfuric acid. Graphs, circuit diagram. 6 ref. (R5, Fe)

180-R. Silicates as Corrosion Inhibitors in Synthetic Detergent Mixtures. Raymond Getty, Newton W. McCready and William Stericker. *ASTM Bulletin,* 1955, no. 205, Apr., p. 50-59.
Use of sodium silicates to reduce corrosion or tarnishing of metals by household detergent mixtures containing polyphosphates. Tables, photographs. 3 ref. (R10)

181-R. More Heat, Less Corrosion. *Chemical Engineering,* v. 62, Apr. 1955, p. 140, 142.
Volatile amines, in process steam, film over metal to control carbon

dioxide and oxygen attack. Photograph, table. (R5)

182-R. Metallurgiucal Aspects of Dry Corrosion. L. B. Pfeil. *Chemistry & Industry,* 1955, no. 9, Feb. 26, p. 208-218.

Influence of composition, structure and stresses on corrosion at elevated temperatures. Micrographs, photographs, table. 36 ref. (R1)

183-R. Metal Corrosion and Protection. I. R. R. Rogers. *Chemistry in Canada,* v. 7, Mar. 1955, p. 37-38.

Corrosion mechanisms; comparison of corrosion rates of ferrous and nonferrous metals. Tables, diagram. (To be continued.) (R general)

184-R. For Cathodic Protection Power—Rectifiers or Sacrificial Anodes? Ray M. Wainwright. *Gas,* v. 31, Mar. 1955, p. 77 + 5 pages.

Application of cost concepts to help management select the system best suited to the conditions. Diagram, graph, table. 7 ref. (R10)

185-R. Effect of the Composition of Gas-Turbine Alloys on Resistance to Scaling and to Vanadium Pentoxide Attack. G. T. Harris, H. C. Child, and J. A. Kerr. *Iron and Steel Institute, Journal,* v. 179, Mar. 1955, p. 241-248.

Scale resistance in moving air of some typical gas-turbine alloys with and without coatings of vanadium pentoxide studied throughout their useful temperature range. Tables, graphs, diagrams. 5 ref. (R2, SG-h)

186-R. Geometric Factors in Electrical Measurements Relating to Corrosion and Its Prevention. W. J. Schwerdtfeger and Irving A. Denison. *Journal of Research, National Bureau of Standards,* v. 54, Feb. 1955, p. 61-71.

Discusses "electrical boundary" of a galvanic couple immersed in an aqueous medium, when corroding normally and also when corrosion is stopped by cathodic protection. Graphs, diagrams. 16 ref. (R1, R10)

187-R. Cathodic Protection of Treating Equipment. W. C. Koger. *Petroleum Engineer (Management Ed.),* v. 27, Mar. 1955, p. 92B-94B.

Operating life of emulsion reduction equipment can be substantially extended through the installation of magnesium alloys. Graphs, photographs, diagram, tables. (R10, Mg)

188-R. Stress Corrosion in High Tensile Wire. Walter O. Everling. *Wire and Wire Products,* v. 30, Mar. 1955, p. 316-319, 346-347.

Causes and correction for corrosion of wire for prestressed concrete. Graphs, diagrams, photographs. (R1, CN)

189-R. Influence of Temperature and Time Upon Intergranular Corrosion of Welds in 18-8 Type Steel. N. Yu. Pal'chuck. *Henry Brutcher Translation No.* 3233, 19 p. (From *Avtomaticheskaya Svarka,* v. 6, no. 2, 1953, p. 3-14.) Henry Brutcher, Altadena, Calif.

Effects of carbon content, microstructure, heat treatment time and service temperature. Table, graphs, micrographs. 20 ref. (R2, SS)

190-R. Resistance to Intergranular Corrosion of Ferritic and Martensitic Stainless Chromium Steels. E. Houdremont and W. Tofaute. *Henry Brutcher Translation No.* 3443, 19 p. (Slightly abridged from *Stahl und Eisen,* v. 72, no. 10, 1952, p. 539-545.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 297-R, 1952. (R2, SS)

191-R. (French.) **Study by Electron Diffraction of the Oxidation of Tin Under Reduced Pressure.** Jean-Jacques Trillat, Léa Tertian, and Marie-Thérese Plattard. *Comptes rendus,* v. 240, no. 5, Jan. 31, 1955, p. 526-528.

On heating pure tin in a vacuum, it was possible to observe the fusion phenomenon and gradual transformation into SnO and SnO_2 oxides. 2 ref. (R2, Sn)

192-R. (French.) **Process of Layer Formation in the Oxidation of Copper Under Low Pressure.** Finn Gronlund and Jacques Bénard. *Comptes rendus,* v. 240, no. 6, Feb. 7, 1955, p. 624-626.

Type and duration of reactions investigated as functions of oxide formed during oxidation at low pressure. 2 ref. (R2, Cu)

193-R. (German.) **Activation Potentials of Iron-Chromium Alloys and Their Relationship to the Chemical Stability in Sulfuric Acid.** Hans-Joachim Rocha and Gustav Lennartz. *Archiv für das Eisenhüttenwesen,* v. 26, no. 2, Feb. 1955, p. 117-123.

Dependence of activation potential upon hydrogen-ion activity in sulfuric acid on iron, iron-chromium alloys and chromium; passivity potential in sulfuric acid containing air. Graphs, table. 11 ref. (R10, Fe, Cr)

194-R. (German.) **The Special Importance of Flow Rate on Sulfuric Acid Corrosion.** H. W. van der Hoeven. *Werkstoffe und Korrosion,* v. 6, no. 2, Feb. 1955, p. 57-62; disc., p. 62.

Effects of velocity and accumu-

lation of corrosion products in the corrosive agent on aluminum-nickel bronze and carbon steel. Diagrams, micrographs. (R5, Al, Ni, Cu, CN)

195-R. (German.) **Alternating Current Corrosion.** H. F. Schwenkhagen. *Werkstoffe und Korrosion,* v. 6, no. 2, Feb. 1955, p. 63-71; disc., p. 71.

Experimental data for d.c., a.c., and pulsating currents used to account for corrosive effects of stray currents on underground transmission lines. Photographs, tables, graphs, circuit diagram. 7 ref. (R1, R8, Cu)

196-R. (German.) **Influence of Flow Rate on Scale Formation and the Subsequent Corrosion in Hot Water Supply Devices.** L. W. Haase. *Werkstoffe und Korrosion,* v. 6, no. 2, Feb. 1955, p. 81-84.

Effects of water composition, container material and flow; benefits of depolarizer. Diagrams. (R4)

197-R. (German.) **Soil Corrosion of Aluminum.** Tihomil Markovic. *Werkstoffe und Korrosion,* v. 6, no. 2, Feb. 1955, p. 84-86.

Effects of air and water in the soil on corrosion rates. Graphs. 6 ref. (R8, Al)

198-R. (Russian.) **Methods of Studying Corrosion Indicators.** I. T. Deev and K. M. Morozova. *Elektricheskie Stantsii,* v. 26, no. 2, Feb. 1955, p. 12-14.

Use of indicator discs and the metallomicroscope micrometer. Corrosion product revealed by X-ray. Table, micrographs, photograph. (R11, CI)

199-R. Galvanic Corrosion Behavior of Titanium and Zirconium in Sulfuric Acid Solutions. David Schlain, Charles B. Kenahan and Doris V. Steele. *Electrochemical Society, Journal,* v. 102, Mar. 1955, p. 102-109.

Studies of couples with aluminum alloys or 18-8 stainless steel. Diagram, tables, graphs. 8 ref. (R1, Ti, Zr, Al, SS)

200-R. Case History of Failure of Marine Boiler Tubes by Stress-Corrosion Cracking. R. D. Barer. *Corrosion,* v. 11, Apr. 1955, p. 18-24.

Results of examination of small samples cut from tubes. Mechanism of caustic cracking. Photographs, micrographs, graphs. 25 ref. (R1)

201-R. Corrosion by Valve Packing. L. M. Rasmussen. *Corrosion,* v. 11, Apr. 1955, p. 25-30.

Observations of valve stem pitting during storage, after hydrostatic testing, indicate that the presence of soluble corrosive agents in the asbestos braid and graphite lubricant were responsible for the condition. Graphs, tables, diagrams, photographs. (R7)

202-R. Current Requirements for Cathodic Protection of Pipe Lines. Marshall E. Parker. *Corrosion,* v. 11, Apr. 1955, p. 52-57; disc., p. 57-58.

Review of definitive methods; recommended procedures. Graphs. 1 ref. (R10)

203-R. Some Corrosion Inhibitors—A Reference List. *Corrosion,* v. 11, Apr. 1955, p. 65-67.

Chemical and trade names, sources of supply, uses, material with which effective, and literature references for 68 inhibitors. Tables. (R10)

204-R. An Interpretation of the Significance of the Potentials of Passive Iron. M. J. Pryor. *Electrochemical Society, Journal,* v. 102, Apr. 1955, p. 163-169.

Explanation of effects of anodic corrosion inhibitors. Graphs. 23 ref. (R10, Fe)

205-R. A Theoretical Basis for a New Method of Investigating Corrosion Inhibition. James G. Jewell. *Electrochemical Society, Journal,* v. 102, Apr. 1955, p. 198-205.

Basis for screening cathodic inhibitors by means of a function that may be determined by potential measurements when an external current is applied. Diagrams. 4 ref. (R10)

206-R. Iron Bacteria in Gasholder Water. A. R. Mitchell. *Gas Journal,* v. 281, Mar. 30, 1955, p. 845-847.

Growth and control. Photographs. (R1, Fe)

207-R. Symposium on Stress-Corrosion. W. D. Robertson. *Metal Progress,* v. 67, Apr. 1955, p. 140 + 4 pages.

A report of papers presented at the "Symposium on Stress-Corrosion Phenomena" held during the 106th Meeting of the Electrochemical Society, Oct. 3-7, 1954, at Boston, Mass. (R1)

208-R. Effect of Temperature on Corrosion of Aluminum. (Digest of "Influence of Temperature on the Rate of Corrosion of Aluminum and Several Aluminum Alloys", by G. V. Akimov and V. V. Romanov; *Doklady Akademii Nauk SSSR,* v. 91, 1953, p. 281-283.) *Metal Progress,* v. 67, Apr. 1955, p. 166, 168, 170, 172.

Previously abstracted from original. See item 22-R, 1954. (R general, Al, Cu, Mg)

209-R. The Corrosivity of Fuming Nitric Acid. John D. Clark and

Michael A. Walsh. *New York Academy of Sciences, Transactions,* v. 17, Feb. 1955, p. 279-288.

Mechanism of corrosion of SS-347 in the red and white acids (97 to 98% acid) is evolved. Graphs. 2 ref. (R6, SS)

210-R. Accuracy of Measurements of Corrosion Damage and of Wall Thickness by the Ultrasonic Method. A. Lutsch. *Henry Brutcher Translation No.* 3473, 15 p. (From *Zeitschrift Verein Deutscher Ingenieure,* v. 96, no. 23, 1954, p. 773-777.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 433-R, 1954. (R11, S14)

211-R. (French.) **Study of the Corrosiveness of Sea Water.** A. Hache and P. Deschamps. *Institut de Recherches de la Sidérurgie, Publications,* ser. A. no. 90, Nov. 1954, 7 p. (Reprinted from *Corrosion et Anti-Corrosion,* v. 2, no. 4, July-Aug. 1954, p. 134-140.)

Describes various factors that intervene in the corrosion of steel in comparison with the action of a sodium chloride solution. Tables, drawing, graphs. 6 ref. (R4, ST)

212-R. (German.) **Chemical Attack on Unprotected Aluminum and the Polishing Process.** H. Ginsberg and F. Baumann. *Metall,* v. 9, nos. 5-6, Mar. 1955, p. 160-163.

Effect of surface treatment on the behavior of aluminum in sodium chloride solution shows necessity of anodic treatment to protect surface. Graphs, photographs, micrographs. 6 ref. (R5, L19, Al)

213-R. Factors and Prevention of Corrosion. C. L. Hibert. *Aero Digest,* v. 70, Apr. 1955, p. 22-31.

A guide to the problem of judging, designing against, and preventing corrosion in aircraft. Diagrams, tables. 5 ref. (R general)

214-R. Salt Spray Corrosion of Cadmium. Russell H. Wolff. *Metal Finishing,* v. 53, Apr. 1955, p. 48-55.

Gives curves relating weight change to exposure time. Graphs, micrographs, tables. 4 ref. (R11, Cd)

215-R. How Arkansas Fuel Oil Tackled Corrosion. W. M. Kyger and G. L. Shepherd. *Oil and Gas Journal,* v. 53, Apr. 18, 1955, p. 141-143.

Plant-wide program for control of CO_2 and H_2O attack in this sweet hydrocarbon treating unit. Tables. (R7)

216-R. (German.) **Corrosion and Heat of Activation.** Max Werner. *Werkstoffe und Korrosion,* v. 6, no. 3, Mar. 1955, p. 113-117.

On the corrosion of aluminum and steel caused by different corrosive agents. Graphs, diagram. 4 ref. (R general, Fe)

217-R. (German.) **Oxidation and Corrosion at Medium and Low Temperatures.** Karl Hauffe. *Werkstoffe und Korrosion,* v. 6, no. 3, Mar. 1955, p. 117-129; disc., p. 129-130.

Because the oxidation and corrosion mechanisms are more complicated, owing to the presence of surface layer electrical fields, the mechanism of passivators on iron and nickel are considered, and a theory on corrosion resistance of chromium-nickel steels is presented. Diagrams, graphs. 39 ref. (R2, R10, Fe, Ni, AY)

218-R. (German.) **On Corrosion of Lead in Distilled Water.** Tihomil Markovic. *Werkstoffe und Korrosion,* v. 6, no. 3, Mar. 1955, p. 133-135.

Influence of the diffusion of oxygen. Photograph, graphs. 14 ref. (R4, Pb)

219-R. (German.) **The Mechanism of the Decomposition of Hydrogen Peroxide on Metallic Lead.** Tihomil Markovic. *Werkstoffe und Korrosion,* v. 6, no. 3, Mar. 1955, p. 136-141.

Results obtained from potentials of the galvanic cells Pb/Pt and Pb/Ag, plotted against time, determined the mechanism of catalytic decomposition. Graphs, tables. 9 ref. (R1, Pb)

220-R. (Russian.) **Hydraulic Protection of Turbines From Cavitation Corrosion.** G. S. Makee and K. K. Shal'nev. *Izvestiia Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk,* 1954, no. 11, Nov., p. 87-104 + 2 plates.

Design and operating conditions of turbines under test. Types of cavitation causing damage, suggested corrective measures. Diagrams, tables, photographs, graphs. 17 ref. (R2, CI, ST)

221-R. The Use of Additives for the Prevention of Low-Temperature Corrosion in Oil-Fired Steam-Generating Units. E. C. Huge and E. C. Piotter. *ASME, Transactions,* v. 77, Apr. 1955, p. 267-274; disc., p. 274-278.

Test data and results of actual operating experience which show effect of additives on the corrosive nature of flue gases. Photographs, tables, graphs, diagrams. 10 ref. (R7)

222-R. Influence of Fine Particles on Corrosion of Economizer and Air-Preheater Surfaces by Flue Gases. Peter Hodson. *ASME, Transactions,* v. 77, Apr. 1955, p. 279-285; disc., p. 285-286.

A qualitative test of the formation temperature, extent and nature of deposits from cleaned and dirty gas showed that deposits tend to build up in a narrow range and that cleaning the gas greatly decreases the rate of deposit build-up. Table, micrographs, diagram, photograph. 12 ref. (R7)

223-R. Titanium Reference Sheet. II. G. E. Hutchinson. *Chemical Engineering Progress,* v. 51, Apr. 1955, p. 38.

Data on corrosion. (R general, Ti)

224-R. Advantages of Wood-Lined Steel Pipe in Corrosive Services. E. H. Bronstein. *Corrosion,* v. 11, May 1955, p. 205-209.

Wood-lined steel pipe is extensively used to transport corrosive and abrasive substances at temperatures up to 185° F. Photographs, tables. 26 ref. (R10, ST)

225-R. High Temperature Corrosion Data. *Corrosion,* v. 11, May 1955, p. 241-245.

By means of tables, corrosion rates are indicated as low, moderate, or high versus specific temperatures. Tables. (R general)

226-R. Results of Some Marine-Atmosphere Corrosion Tests on Magnesium-Lithium Alloys. P. D. Frost, F. W. Fink, H. A. Pray and J. H. Jackson. *Electrochemical Society, Journal,* v. 102, May 1955, p. 215-218.

Ultralight, high-strength alloys for structural applications exposed for 32 months to the seacoast atmosphere near Daytona, Fla. One experimental alloy, containing about 9% lithium, had almost as good corrosion resistance as a commercial magnesium-aluminum-zinc alloy. Micrographs, graphs, table. 8 ref. (R3, Mg)

227-R. On the Nature of Lead Surfaces Passivated in Sulfuric Acid. E. J. Casey and K. N. Campney. *Electrochemical Society, Journal,* v. 102, May 1955, p. 219-225.

Experimental results show that the rate of ennoblement of the electrochemical potential of lead, which is passivated in sulfuric acid, is markedly dependent on the concentration of hydrogen peroxide, whether formed by irradiation or added directly to the system. Graphs, micrographs, circuit diagram, tables, diagram. 14 ref. (R10, Pb)

228-R. The Interactions of Static Stress and Corrosion With Aluminium Alloys. F. A. Champion. *Institute of Metals, Journal,* v. 83, Apr. 1955, p. 385-392.

Use of alloy compositions and heat treatments designed to give the highest mechanical properties tends to result in varying degrees of susceptibility to stress-corrosion. Graphs, tables. 27 ref. (R1, Al)

229-R. Rate of Formation of Film on Metals and Alloys. G. P. Chatterjee. *Journal of Applied Physics,* v. 26, Apr. 1955, p. 363-365.

Film growth on copper-zinc and copper-magnesium alloys with or without the addition of aluminum or manganese. Tables, graphs. 4 ref. (R2, Cu, Zn, Mg, Mn, Al)

230-R. Current Requirements for Cathodic Protection of Well Casing. Leendert de Witte. *Oil and Gas Journal,* v. 54, May 9, 1955, p. 109-116.

Considers interpretation of both open hole and inside casing spontaneous potentials surveys with regard to prediction and treatment of external casing corrosion. Graphs, tables, circuit diagrams. 5 ref. (R10)

231-R. Smart Control of Humidity Licks Metal Corrosion During In-Process Storage. A. M. Beebee, Jr. *Power,* v. 99, May 1955, p. 110-111.

Design of in-process storage room. Photographs. (R3, ST)

232-R. An Interesting Case of Corrosion of Steam Turbines. A. Splittgerber. *Henry Brutcher Translation No.* 2925, 5 p. (From *Vom Wasser* (A Yearbook for Water Chemistry and Water Purification), v. 17, 1949, p. 146-149.) Henry Brutcher, Altadena, Calif.

Effect of steam and mixtures on corrosion of steel at 210° F. Corrosion phenomena of idle turbines explained. Table, diagram. (R4, SS, ST)

233-R. (Russian.) **Relation of the Corrosion Rate of Iron to the pH of Solution, and the Passivation of the Metal in Alkaline Solutions.** L. K. Lepin', A. Ia. Vaivade and Z. F. Oshis. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 2, Feb. 1955, p. 350-355 + 1 plate.

Oxidation kinetics of iron in various media; transition from gamma to alpha form. Retardation of corrosion at certain pH values. Graphs, table, diffraction patterns. 10 ref. (R2, R10, Fe)

234-R. Action of Boiler Water on Steel—Attack by Bonded Oxygen. C. E. Kaufman, W. H. Trautman, and W. R. Schnarrenberger. *ASME, Transactions,* v. 77, May 1955, p. 423-430; disc., p. 430-432.

Information relating to attack by boiler water on steel of boilers and

superheaters. Table, diagrams, photographs, micrographs. 16 ref. (R4, ST)

235-R. Corrosion of Steel in Boilers—Attack by Dissolved Oxygen. H. A. Grabowski. *ASME, Transactions,* v. 77, May 1955, p. 433-441; disc., p. 441-448.

Various theories that have been proposed to explain the severe, although local, corrosion of furnace-wall tubes in high-pressure boilers. Metallurgical significance of failures and welding techniques also discussed. Photographs, micrographs, graphs. 4 ref. (R4, ST)

236-R. Causes of Catalytic Corrosion. (Digest of "Catalytic Corrosion," by S. Z. Roginskii, I. I. Tret'yakov and A. B. Shekhter; *Doklady Akademii Nauk SSSR,* v. 91, 1953, p. 881-884.) *Metal Progress,* v. 67, May 1955, p. 177-178, 180.

Previously abstracted from original. See item 37-R, 1954. (R1)

237-R. Investigation of Accident Involving Titanium and Red Fuming Nitric Acid, December 29, 1953. P. M. Ambrose, J. C. Barrett, R. W. Huber, David Schlain and V. C. Petersen. *U. S. Bureau of Mines, Information Circular* 7711, Mar. 1955, 34p.

Stress-corrosion testing of spot-welded titanium samples in red fuming nitric acid and investigation of explosion occurring during test. Tables, micrographs, photographs, diagram. (R1, Ti)

238-R. Coatings and Cathodic Protection for Steel Pipelines. II. G. I. Russell. *Corrosion Prevention and Control,* v. 2, May 1955, p. 21-24.

Joint use of cathodic protection and a high-quality coating combination will continue to provide the best performance at minimum projected total cost. Photographs. 7 ref. (R10, L general, CN)

239-R. Corrosion in the Brewing Industry. *Corrosion Technology,* v. 2, Apr. 1955, p. 117-119.

Cost of corrosion; paints and protective coatings; use of zinc-rich coatings; epoxy-type resin; future developments. (R7, L26, Zn)

240-R. How Richfield Tackled Hydrogen Blistering. B. W. Neumaier and C. M. Schillmoller. *Oil and Gas Journal,* v. 54, May 23, 1955, p. 107-110.

Corrosion control measures include hydrogen sulfide removal and water washing procedures. Diagrams, tables, photograph. 9 ref. (R2)

241-R. Corrosion Research Laboratories. III. The U. S. National Bureau of Standards. J. G. Thompson. *Corrosion Technology,* v. 2, Apr. 1955, p. 102-105.

Investigates corrosion of metals in underground service, and in marine and other environments, with and without applied stress. Photographs. 20 ref. (R11)

242-R. Corrosion Fatigue. E. A. Smith. *Aeronautics,* v. 32, May 1955, p. 40-42.

Importance as a factor in safety considerations. Diagrams, graphs. 11 ref. (R1)

243-R. Liquidus of Metal-Oxide/V_2O_5 Systems. G. Lucas, M. Weddle and A. Preece. *Iron & Steel,* v. 28, May 1955, p. 264-267.

Suggests approach to problem of heat resistant alloy attack by the development of alloys which would depend on some element, other than chromium, for their oxidation resistance, or by prevention of vanadium pentoxide reacting with the protective oxide film. Graphs. (R2, SS)

244-R. Gas-Turbine Alloys. G. T. Harris, H. C. Child and J. A. Kerr. *Iron & Steel,* v. 28, May 1955, p. 268-271.

Effect of the composition on resistance to scaling and to V_2O_5 attack. Graphs, tables. (R2, T25, SG-g, h)

245-R. Effects of Aluminium and Manganese on the Resistance Against Atmospheric Corrosion of Some Copper Alloys. G. P. Chatterjee. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 211-221; disc., p. 221-222.

Behavior of copper-zinc and copper-magnesium alloys with reference to atmospheric corrosion. Graphs, tables. 5 ref. (R3, Cu, Mg, Zn, Al, Mn)

246-R. (German.) **Contribution to the Problem in Intergranular Corrosion of Austenitic Chromium-Nickel Steel.** Erwin Brauns and Günther Pier. *Stahl und Eisen,* v. 75, no. 9, May 5, 1955, p. 579-586; disc., p. 586.

Plotting of "current-density-potential" curves of an unstabilized stainless steel after quenching and reheating to 650° C. for up to 192 hr. Diagrams, graphs, micrographs, table. 9 ref. (R2, SS)

247-R. Electrical Grounding Systems and Corrosion. L. P. Schaefer. *Application and Industry,* 1955, no. 18, p. 75-81; disc., p. 81-83.

Considers proper conduction of electric currents to the earth re-

sulting in adequate grounding and conduction of currents through the earth resulting in corrosion or the prevention of corrosion. Diagrams, graph, table. 15 ref. (R1, R8)

248-R. Underground Corrosion on Rural Electric Distribution Lines. O. W. Zastrow. *Application and Industry,* 1955, no. 18, p. 101-108; disc., p. 108-109.

Studies of corrosion associated with grounding of multi-ground wye-connected distribution lines. Map, graphs, diagrams, photograph, table. (R1, R8)

249-R. Exhaust Valve Corrosion in Gasoline Engines. C. H. Allen and M. J. Tauschek. *Automotive Industries,* v. 112, June 1, 1955, p. 52-55, 116, 118.

Review of corrosion resistance of various valve steels. Graphs. (R9, AY)

250-R. Metal Corrosion and Protection. II. R. R. Rogers. *Chemistry in Canada,* v. 7, May 1955, p. 38-41.

Coating for iron, zinc, aluminum and magnesium; laboratory corrosion tests. Tables, graph, photograph. 16 ref.
(R11, L general, Fe, Zn, Al, Mg)

251-R. Corrosion in the Petroleum Industry. I. F. H. Garner and A. R. Hale. *Corrosion Technology,* v. 2, May 1955, p. 143-146.

Reference to various types of operation in the petroleum industry. Photographs, table. 6 ref. (R7)

252-R. How Carefully Do You Control Your Salt Spray Test? H. A. Holden. *Corrosion Technology,* v. 2, May 1955, p. 157-159, 163.

Considers so-called "salt-fog" testing method. Tables, photograph. 14 ref. (R11)

253-R. The Influence of Vanadium Pentoxide on the High-Temperature Scaling of Heat-Resisting Alloys. W. Betteridge, K. Sachs and H. Lewis. *Institute of Petroleum, Journal,* v. 41, May 1955, p. 170-180.

Materials used; scaling without stress; effects of corrosion on high-temperature properties. Micrographs, tables, graphs, photographs. 7 ref. (R2, SG-h)

254-R. Cathodic Protection With Zinc Anodes. (Digest of "Sound Application for Zinc Anodes", by A. W. Peabody; presented at the Thirty-Sixth Annual Meeting of the American Zinc Institute, St. Louis, Mo., Apr. 21, 1954.) *Metal Progress,* v. 67, June 1955, p. 172, 174, 176.

Previously abstracted from original. See item 341-R, 1954.
(R10, T general, Zn)

255-R. Here's What They're Doing to Stop That Costly Corrosion in Refining Equipment. Gerald L. Farrar. *Oil and Gas Journal,* v. 54, June 6, 1955, p. 120, 123.

Corrosion reactions, summary of refinery experience. Photographs. (R7)

256-R. (German.) **Causes of Corrosion.** H. Grubitsch. *Chemie-Ingenieur-Technik,* v. 27, no. 5, May 1955, p. 287-298.

Reports on tarnish and scale actions in the system metal-gas and thermodynamic treatment of corrosion actions. Diagrams, graphs, tables. 123 ref. (R general)

257-R. (German.) **Corrosion of Pipes and Protection Against Corrosion in Chemical Plants.** H. Klas and G. Heim. *Chemie-Ingenieur-Technik,* v. 27, no. 5, May 1955, p. 299-307.

Corrosion phenomena due to water, acids, lye solutions and gases and their causes. Measures for protection against corrosion, divided in three groups—active protection, application of protective coatings and selection of suitable materials for pipes. Diagrams, photographs, tables, graphs. 60 ref. (R5, R6, R9)

258-R. (German.) **The Development of the Cathodic Protection Against Corrosion of Metallic Construction Under Water and in Soils.** J. Iliovici. *Werkstoffe und Korrosion,* v. 6, no. 4, Apr. 1955, p. 181-189.

Equipment and methods for protection of pipelines, pile-foundations, ships and electric cables. Table, diagrams, photographs. (R10)

259-R. (German.) **Cathodic Protection Against Corrosion in the Chemical Industries.** W. Rausch. *Werkstoffe und Korrosion,* v. 6, no. 4, Apr. 1955, p. 189-196; disc., p. 197-198.

Theory, materials and procedures for protection of pipe-lines, sluice-pipes, coolers, condensers and hot water tanks against corrosion by aqueous electrolytes. Graphs, diagrams, photographs. 6 ref. (R10)

260-R. (Russian.) **Resistance to Corrosion of Various Metals in Soda-Potash and Soda-Sulfate Solutions.** V. G. Inzhechik and A. V. Ianush. *Khimicheskaia Promyshlennost',* 1955, no. 1, Jan.-Feb., p. 39-42.

Laboratory and plant tests of corrosion rates, effect of temperature and covering atmospheres, compara-

tive resistance of different steels and irons. Graphs, tables. (R5, ST, CI, NI)

261-R. (Russian.) **Corrosion Behavior of Multilayer Metallic Coatings.** V. V. Romanov. *Zhurnal Prikladnoi Khimii,* v. 28, no. 5, May 1955, p. 475-479.

Composition of electrolytes and manner of application. Electrode potentials in relation to time in solution of sodium chloride. Potential of chromium compared to that of Fe, Cu, Ni, Cr multilayer coating. Polarization curves. Graphs, photograph, tables, diagram. 7 ref.
(R5, L17, Fe, Cu, Ni, Cr)

262-R. (Russian.) **Effect of Temperature on the Corrosion of Metals by Chlorine.** Kh. L. Tseitlin. *Zhurnal Prikladnoi Khimii,* v. 28, no. 5, May 1955, p. 490-496.

Two groups of metals in terms of their resistance to dry chlorine at a high temperature. Release of heat during reactions. Special resistance of lead despite its low melting point. Effect of chlorine contrasted to that of other gases. Table, graph, micrographs. 9 ref.
(R6, Al, ST, CN, CI, AY, Cu, Ni, Pb)

263-R. Acid Corrosion Inhibition by High Molecular Weight Nitrogen-Containing Compounds. Raymond A. George and Norman Hackerman. *Corrosion,* v. 11, June 1955, p. 249-253; disc., p. 254.

Adsorption from benzene solution onto steel powder and the effect of this treatment on the reactivity of the steel in aqueous acid solution determined. Graphs, tables, 15 ref. (R10, ST)

264-R. Use of the Pearson Bridge in Corrosion Inhibitor Evaluation. E. J. Simmons. *Corrosion,* v. 11, June 1955, p. 255-260.

Basic operation of the Pearson bridge and a circuit for measurement of electrode potentials of remote electrodes in the presence of current flow described. Photograph, graphs, diagrams. 3 ref. (R10)

265-R. Control of Internal Corrosion of a Products Pipe Line System. P. L. DeVerter and A. W. Jasek. *Corrosion,* v. 11, June 1955, p. 261-265; disc., p. 265-266.

Considers the matter of controlling internal corrosion in a pipe-line system and reports experience with two control methods. Tables, diagram. 8 ref. (R10)

266-R. The Effect of Cobalt on the High Temperature Oxidation of Nickel. S. F. Frederick and I. Cornet. *Electrochemical Society, Journal,* v. 102, June 1955, p. 285-291.

Nickel-cobalt alloys of high purity, in sheet form, were oxidized in air at temperatures ranging from 800 to 1400° C. to determine rate of oxidation. Tables, graphs, micrograph. 14 ref. (R2, Ni, Co)

267-R. The Difference Effect on Aluminum Dissolving in Hydrofluoric and Hydrochloric Acids. M. E. Straumanis and Y. N. Wang. *Electrochemical Society, Journal,* v. 102, June 1955, p. 304-310.

Positive difference effect was observed during dissolution of high-purity aluminum coupled with platinum in 0.05, 0.1, 0.25, 0.5, 0.75, 1.0 and 2.0 hydrofluoric acid at 25° C. The effect was directly proportional to the galvanic current up to 60 milliamp. per sq. cm., being nearly independent of the concentration of the acid. Tables, graphs, diagram. 22 ref. (R6, Al)

268-R. Mathematical Studies of Galvanic Corrosion. II. Coplanar Electrodes With One Electrode Infinitely Large and With Equal Polarization Parameters. James T. Waber and Marshall Rosenbluth. *Electrochemical Society, Journal,* v. 102 June 1955, p. 344-353.

Expressions for potential and current density distribution were derived for two mathematically similar corrosion problems: tiny anodes buried in infinite cathodes, and tiny foreign cathodic inclusions in a metal. Table, graph, diagrams. 15 ref. (R1)

269-R. Bolt Materials for Underground Use. *Gas Age,* v. 115, June 2, 1955, p. 38-39.

Addition of small amount of copper, nickel or chromium appears to offer promise. Some bolt materials can be protected against corrosion by making them cathodic to the structures which they fasten. Photographs, table. 3 ref. (R8)

270-R. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 47, June 1955, p. 91A-92A.

Procedures for stress-corrosion tests. Photographs, diagrams. (R1)

271-R. Electrochemical Principles of Metallic Coatings. I. Electrochemical Principles of Corrosion. L. L. Shreir. *Industrial Finishing (London),* v. 8, May 1955, p. 261 + 4 pages.

Dry and wet corrosion; potentials of corroded metals; electrochemical cells. Tables, diagrams. 13 ref. (R1)

272-R. Of What Use Are Chemical Treatments in Controlling Corrosion? S. T. Powell and L. G. von Lossberg. *Mechanical Engineering,* v. 77, June 1955, p. 495-498.

An evaluation of corrosion inhibitors now being offered widely for the solution of numerous problems in the field of steam-generating equipment. Diagram, table, graphs. (R10)

273-R. When Does Cathodic Protection Pay Out? Dean C. Glass. *Pipe Line Industry,* v. 2, June 1955, p. 37-38.

Survey of pipe line companies shows some surprising results as to the cost and pay-out of cathodic protection. Tables. (R10)

274-R. Mechanism of Water Pipe Corrosion. Rolf Eliasson and James C. Lamb, III. *Water and Sewage Works (Reference and Data Edition),* v. 102, June 1, 1955, p. 107R-112R.

Corrosion cells and their formation; rate and distribution of corrosion. Diagrams, tables, graphs. (R4)

275-R. (French.) **Use of Polarization Curves for the Study of Corrosion and Protection of Iron in the Presence of Chlorides. Phosphatization and Oxidizing Phosphatization.** Anwar Mahmoud Abd El Wahed and Marcel Pourbaix. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 19, 1954, 8 p.

Influence of different quantities of disodium phosphate and potassium chromate on the behavior of iron and different steels in the presence of chlorinated solutions of bicarbonate. Tables, graphs, photographs. 7 ref. (R10, R11, ST, Fe)

276-R. (French.) **Contribution to the Chemical Study of the Corrosion of Copper in Sodium Chloride Solutions.** W. Feitknecht and W. Schütz. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 327-334.

Observations on aspect of underlying metal after dissolution of the corrosion layers. Rate of etching and its dependence upon concentration. Micrographs, photographs, graphs, tables. 10 ref. (R5, Cu)

277-R. (German.) **Technical Problems of V_2O_5.** K. Konopicky. *Brennstoff-Chemie,* v. 36, nos. 9-10, May 11, 1955, p. 151-155.

Effect of V_2O_5 on furnace linings and metal parts. Graphs, tables, photographs. 63 ref. (R9, V)

278-R. (German.) **Filiform Corrosion—a New Type of Corrosion.** A. Bukowiecki. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 165-168.

Appearance and explanation of formation mechanism of filiform corrosion. Photograph, micrographs, diagram. 5 ref. (R2)

279-R. (Italian.) **Behavior of Various Inhibitors in Galvanic Corrosion.** G. Bombara and F. Gianni. *Rivista dei Combustibili,* v. 9 no. 4, Apr. 1955, p. 297-313.

Evaluation of inorganic inhibitors by means of galvanic polarization curves. Diagrams, tables, graphs. 7 ref. (R10)

280-R. Report of Committee A-5 on Corrosion of Iron and Steel. *American Society for Testing Materials, Preprint No.* 4, 1955, 48 p.

Results of atmospheric corrosion tests on wire, wire products and structural shapes. Proposed tentative specifications for zinc-coated steel chain-link fence fabric; zinc-coated (galvanized) iron or steel sheets, coils and cut lengths; 1.25 oz. ordered coating (pot yield) zinc-coated (galvanized) iron or steel roofing sheets; and zinc-coated (galvanized) steel tie wires. Tables. (R3, S22, L16)

281-R. Report of Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys. *American Society for Testing Materials, Preprint No.* 7, 1955, 15 p.

Tentative recommended practice for conducting acidified copper sulfate test for intergranular attack in austenitic stainless steel and for boiling nitric acid test for corrosion-resisting steels. Micrographs, table. (R11, SS)

282-R. The Atmospheric Corrosion of Rolled Zinc. E. A. Anderson. *American Society for Testing Materials, Preprint No.* 91a, 1955, 9 p.

Corrosion of zinc in the atmosphere is controlled by three principal factors: frequency of rain and dewfall, acidity of moisture, and rate of drying. Tables. 5 ref. (R3, Zn)

283-R. Effect of Natural Atmospheres on Copper Alloys: 20-Year Test. A. W. Tracy. *American Society for Testing Materials, Preprint No.* 91*b*, 1955, 10 p.

Corrosion resistance of 11 copper alloys exposed to industrial, marine and rural atmospheres over a period of 20 yr. Evaluation is based on weight loss measurements and changes in mechanical properties of sheet specimens. Tables, graphs. 7 ref. (R3, Cu)

284-R. The Atmospheric Corrosion of Copper—Results of 20-Year Tests. D. H. Thompson, A. W. Tracy and John R. Freeman, Jr. *American Society for Testing Materials, Preprint No.* 91c, 1955, 11 p.

Eleven brands of copper, in the form of sheet and wire, were exposed for 20 yr. to four outdoor atmospheres, and the effect of corrosion evaluated by loss in weight and strength and gain in electrical resistance. Tables. 5 ref. (R3, Cu)

285-R. Corrosion Fatigue of Low-Carbon Steel Welded Joints. A. M. Abd-El-Wahed. *British Welding Journal,* v. 2, June 1955, p. 247-253.

Corrosion fatigue of 0.15% carbon steel, with sodium chloride solution as the corrosive medium. All-weld-metal specimens and specimens from the heat-affected zone were included in the tests. Diagrams, graphs, tables, micrographs, radiograph. 8 ref. (R1, Cn)

286-R. Nionel Reference Sheet. II. W. Z. Friend. *Chemical Engineering Progress,* v. 51, June 1955, p. 296.

Corrosion behavior in several media. Comparisons with other alloys in 85% phosphoric acid. (To be continued.) (R6, Ni)

287-R. Special Corrosion Problems of Electric Utility Systems. C. F. Avila and A. B. Jones. *Corrosion,* v. 11, July 1955, p. 291-294.

Causes of several cases of corrosion in the outside plant of electric utilities and remedies adopted for mitigation, including corrosion problems involving corrosion cracking, galvanic action, ground line corrosion of standpipes, water pockets, horizontal surfaces, joints, concrete corrosion of lead, nitrous oxide attack where corona forms. Specifications and details for construction and protection of a zinc-sprayed subway transformer tank. Photographs, tables, diagrams. (R general)

288-R. Carbon Anode Installed in Electric Cable Conduit. Howard L. Davis, Jr. *Corrosion,* v. 11, July 1955, p. 295-298.

Description of high ampere-year impressed anode consisting of graphite rods connected to an insulated header wire. Photographs, diagram, tables, graph. (R10, Pb)

289-R. Construction Materials for Liquid Sodium Systems. E. G. Brush. *Corrosion,* v. 11, July 1955, p. 299-302; disc., p. 302-303.

Resistance of alloys to attack by sodium. Selection of materials of construction that will give satisfactory service in high-temperature sodium systems. Diagrams, graphs, micrographs. (R5, T25, Na)

290-R. Severe Pitting of Stainless (18-8) Steel in Hot Chloride Dye-Baths. Frank N. Speller. *Corrosion,* v. 11, July 1955, p. 303.

Details of attack on welded and cast stainless dyeing equipment. Addition of about 500 p.p.m. sodium nitrate or sodium chromate to the dye bath and scouring water before salting minimized further damage. Micrograph. (R6, R10, SS)

291-R. Filiform Corrosion Products on Iron Immersed in Brine. P. F. Thompson and K. F. Lorking. *Corrosion,* v. 11, July 1955, p. 309-311.

A new type of filiform corrosion pustule observed on steel test specimens immersed in a commercial refrigerating brine containing chromate as a corrosion inhibitor. These filaments were secondary corrosion products growing from primary hemispherical pustules on the metal surface. Mechanism of the growth of the filaments. Micrographs. 6 ref. (R6, R10, Fe)

292-R. Note on "Inverted Relief" in Photographic Illustrations. Neil S. Dempster. *Corrosion,* v. 11, July 1955, p. 312-314.

Points to errors in the orientation of photographs illustrating pitting or blistering forms of corrosion which result in incorrect relief perception by the reader. Suggests photographing specimens illustrating pitting and blistering phenomena so that the shadow falls toward the bottom of the paper. Photographs, micrographs. (R2)

293-R. Cast Irons in High Temperature Service. Richard J. Greene and Frederick G. Sefing. *Corrosion,* v. 11, July 1955, p. 315-321.

Oxidation resistance of cast irons in grate bars and furnace doors. Graphs, micrographs, photographs, tables. 5 ref. (R2, CI)

294-R. On the Passivity of Iron. Karl Friedrich Bonhoeffer. *Corrosion,* v. 11, July 1955, p. 304-308. (Translated from *Zeitschrift für Metallkunde,* v. 44, no. 3, Mar. 1953, p. 77-81.)

Previously abstracted from original. See item 113-R, 1953. (R10, Fe)

295-R. Magnesium Anodes in a Chemical Plant. Oliver Osborn. *Corrosion Technology,* v. 2, June 1955, p. 170-173.

Use of magnesium anodes in structures handling large volumes of sea water and brine, both static and in motion. Diagrams, photographs. 1 ref. (R10, R4)

296-R. Corrosion in the Tannery. F. E. Humphreys. *Corrosion Technology,* v. 2, June 1955, p. 174-176.

Metals used for different tanning processes and methods of protecting structural steelwork. Photographs. 21 ref. (R5, L26, SG-g, CN)

297-R. Corrosion in the Petroleum Industry. II. F. H. Garner and A. R. Hale. *Corrosion Technology,* v. 2, June 1955, p. 177-180.

Corrosion of condensing and cracking equipment. Attack of pipes and tanks by sulfuric and phosphoric acids. Photographs. 9 ref. (To be continued.) (R7, R6)

298-R. The Effect of Hydrochloric Acid on the Corrosive Nature of Combusion Gases Containing Sulphur Trioxide. R. W. Kear. *Journal of Applied Chemistry,* v. 5, May 1955, p. 237-242.

Mild steel probes studied from 27 to 150° C.; a corrosion peak exists between water and acid dew-points. Acid and chlorine increase corrosion. Graphs, diagrams. 7 ref. (R9, CN)

299-R. Metallic Materials Resistant to Molten Zinc. Webster Hodge, R. M. Evans and A. F. Haskins. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 824-832.

Refractory boron compounds are shown to resist corrosion by molten zinc. Coatings were made from ferroboron and manganese boron by several methods: welding, hard facing, and pack diffusion. Diagram, tables, photographs, micrographs, graph. 23 ref. (R6)

300-R. Water Conditioning for Scale and Corrosion Control. Richard B. Conlon. *Paint Industry Magazine,* v. 70, May 1955, p. 34-39, 45-46.

Classifies water by source and describes scaling and corrosion control methods in boiler, cooling, and process waters. Table, graphs, photographs. (R4)

301-R. The Five Per Cent Salt Spray and Its Acetic Acid Modification. Wardley D. McMaster. *Plating,* v. 42, July 1955, p. 904-906.

Use of the acetic acid salt spray as a practical means of evaluating plating quality. Photographs, tables. 4 ref. (R11, L17, Cr, Cu, Ni)

302-R. Tests Lick Condenser-Tube Corrosion. William D. Bissell. *Power,* v. 99, July 1955, p. 102-104.

Analysis of the trouble, testing program and progress that has been made. Photograph, diagrams. (R11, R4)

303-R. (French.) **Electrochemical Behavior of Manganese. Potential-pH Equilibrium Diagram of the System Mn-H_2O, at 25° C.** A. M. Moussard, J. Brenet, F. Jolas, M. Pourbaix and J. van Muylder. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 18, 1954, 7 p.

General properties of manganese, its oxides and solutions; behavior of manganese dioxide in voltaic cells. Diagram. 18 ref. (R5, Mn)

304-R. (German.) **The Stress Corrosion of Brass and Its Prevention by Silicon.** H. Steinle. *Metall,* v. 9, nos. 11-12, June 1955, p. 492-495.

Effect of silicon content and degree of cold working on susceptibility to stress corrosion and hardness of brasses. Photographs, graphs, micrographs, tables. (R1, Q29, Cu)

305-R. (Polish.) **Oxide Scaling on Nickel.** Lucjan Czerski and Franciszek Franik. *Archiwum Gornictwa i Hutnictwa,* v. 3, no. 1, 1955, p. 43-68.

Mechanism of scale formation at high temperatures; chemical composition and microstructure of scale at various depths. Experimental method involves use of a "witness" metal (platinum wires) in following the scaling process. Diagrams, micrographs, tables. 24 ref. (R2, M27, Ni)

306-R. (Russian.) **Corrosive and Electrochemical Behavior of Electropolished Aluminum.** I. L. Rozenfel'd and P. V. Shchigolev. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 4, Apr. 1955, p. 668-670.

Role of oxide film in the increased corrosion resistance of electropolished aluminum; advantages of electropolished over mechanically polished aluminum, subjected to sodium sulfate and sodium chloride solutions; effect of copper, stainless steel, zinc and magnesium in contact with aluminum. Cathodic polarization. Graphs. 1 ref. (R10, L13, Al)

307-R. Corrosion Aspects of Air Pollution. Leonard Greenburg and Morris B. Jacobs. *American Paint Journal,* v. 39, July 11, 1955, p. 64 + 7 pages.

Classification of atmospheres and their active corrosive agents; types of materials affected and their relative degree of resistance; effects of climatic conditions; bacterial deterioration. Tables. 15 ref. (R3)

308-R. The Use of Non-Ferrous Metals in Domestic Water Supply. Hector S. Campbell. *Chemistry & Industry,* 1955, no. 25, June 18, p. 692-698.

Performance of galvanized steel, lead, aluminum and copper pipes and tanks. 16 ref. (R4, CN, Pb, Al, Cu)

309-R. Corrosion in the Brewery. I. The Brewhouse. D. H. Edmonds. *Corrosion Prevention and Control,* v. 2, June 1955, p. 21-26.

Corrosive influences to be found in breweries, bottling stores and maltings; methods by which they are or may be controlled. Photographs. (To be continued.) (R7)

310-R. High Temperature Oxidation of Two Zirconium-Tin Alloys. M. W. Mallett and W. M. Albrecht. *Electrochemical Society, Journal,* v. 102, July 1955, p. 407-414.

Rate of oxidation of a zirconium alloy with 1.5 wt.% tin followed a cubic law in the temperature range from 600 to 900° C. at one atmosphere pressure, while the rate for an alloy with 2.5% tin followed a parabolic law in the range 550 to 900° C. The effect of tin in the zirconium increases the porosity of films and decreases the time before breakdown of the protective properties of the films. Tables, graphs, micrographs, diagram. 9 ref. (R2, Zr)

311-R. Dissolution of Metals in Aqueous Acid Solutions. I. Current-Potential Relations for Iron and Mild Steel. A. C. Makrides, N. M. Komodromos and Norman Hackerman. *Electrochemical Society, Journal,* v. 102, July 1955, p. 363-369.

Measurements of electrode potentials in hydrochloric acid alone and in hydrochloric acid solutions containing depolarizers discussed on basis of mixed-potential theory. Graphs. 18 ref. (R2)

312-R. The Rate and Mechanism of Dissolutions of Purest Aluminum in Hydrofluoric Acid. M. E. Straumanis and Y. N. Wang. *Electrochemical Society, Journal,* v. 102, July 1955, p. 382-386.

Tests to determine rate of dissolution of pure aluminum in hydrofluoric acid; effect of additions of ammonium fluoride and ammonium chloride on the dissolution rate. Table, graphs. 17 ref. (R2, R5, Al)

313-R. Mathematical Studies of Galvanic Corrosion. III. Semi-Infinite Coplanar Electrodes With Equal Constant Polarization Parameters. James T. Waber. *Electrochemical Society, Journal,* v. 102, July 1955, p. 420-429.

Mathematical analysis of a coplanar alternating array of long narrow electrodes was conducted subject to the limitation that polarization parameters for the anodes and cathodes are constant and equal. Diagrams, graphs, tables. 13 ref. (R1)

314-R. Cathodic Protection of Ships: Experience With Laid-Up Ships of Reserve Fleet. L. T. Carter and J. T. Crennell. *Engineering,* v. 179, June 3, 1955, p. 689-691.

Zinc protectors, wet sand-blasting, cathodic protection and paint, anode material and position, advantages of flame scaling. (R10)

315-R. The Pitting of an Aluminium Porringer by Copper-Contaminated Water. J. M. Bryan. *Journal of the Science of Food and Agriculture,* v. 6, June 1955, p. 305-311.

Investigation of rapid pitting of aluminum when in contact with water contaminated with copper and in the presence of salt. Tables. 4 ref. (R2, Al)

316-R. Human Body Fluids Affect Stainless Steel. Carl Andrew Zapffe. *Metal Progress,* v. 68, July 1955, p. 95-98.

It is shown that mechanochemical attack extends to the austenitic stainless steels, which have failed from stresses not exceeding the residual effects of cold working, and from corrodents and other products of human physiological processes. Micrographs. (R1, SS)

317-R. Cathodic Protection for Oil-Well Casing. J. P. Barrett and E. D. Gould. *Oil and Gas Journal,* v. 54, July 18, 1955, p. 90-91.

Types of attack, current requirements, results of cathodic protection, surface pipe effect and cost. Graphs. 4 ref. (R10)

318-R. Anodizing as a Means of Evaluating the Corrosion Resistance of Zirconium and Zirconium Alloys. R. D. Misch. *U. S. Atomic Energy Commission, ANL*-5229, 1953, 87 p.

Differences in anodic behavior correlated with corrosion resistance. Differences of zirconium were noticeable in rise of voltage with time at low current densities but indistinguishable in the relationship between interference colors and applied voltage. Diagrams, graphs, photographs, tables. 28 ref. (R11, Zr)

319-R. How to Reduce Corrosion in Production Operations. W. C. Koger. *World Oil,* v. 141, July 1955, p. 182 + 6 pages.

Use of cathodic protection to mitigate the corrosion problem has reduced maintenance expenses substantially. Graphs. (R10)

320-R. (French.) **Reports of the Cebelcor Research Meeting, April 13-14,**

1955. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 22, 1955, 80 p.

Activity and progress of research at the Belgium Corrosion Research Center on electrochemical behavior of metals, cathodic protection, scaling, direct aid to industry and international cooperation in research. Graphs, diagrams, photographs. (R general)

321-R. (French.) **Application of Anticorrosive Protection to Condenser Tubes.** A. J. Maurin. *Industrie Chimique Belge,* v. 20, no. 5, May 1955, p. 485-498.

Based on experience from salvage of tubes from 25,000 kw. condensers fed with polluted sea-water. Tables, graphs, diagrams. (R4, R10)

322-R. (French.) **Rate of Dissolution of Titanium in Phosphoric Acid.** T. G. Owe Berg. *Journal de chimie physique,* v. 52, no. 5, May 1955, p. 363-366.

Rate of dissolution of titanium in 6*N* to 28*N* phosphoric acid at 40, 50 and 60° C. is proportional to normality. Graphs. 3 ref. (R5, Ti)

323-R. (German.) **Internal Stresses in Polyethylene Insulating Covers for Marine Cables. III. The Effect of Differential Cooling Temperature of Tube.** W. Kortsch. *Kolloid-Zeitschrift,* v. 141, no. 3, May 1955, p. 160-165.

Effect of cooling temperatures on internal stresses and stress-corrosion. Tables, graphs, diagrams. 13 ref. (R1, Q25)

324-R. (German.) **Microbes as a Cause of the Destruction of Bitumen Insulation.** Th. Temme. *Bitumen, Teere, Asphalte, Peche,* v. 6, no. 5, May 1955, p. 161-164.

Microbic damage of corrosion-protective coatings and oxidation of hydrocarbons. Table, photographs. (R1)

325-R. (German.) **Formation of Protective Layer and Steam Decomposition (Cracking) in Steel Pipes at High Temperatures.** E. Ulrich. *Brennstoff-Wärme-Kraft,* v. 7, no. 6, June 1955, p. 241-248.

Decomposition of steam into oxygen and hydrogen at high temperatures and its influence of inside surface of steel pipes. The theory of the phenomenon. Diagram, graphs, tables. 12 ref. (R4)

326-R. (German.) **Stress-Corrosion Phenomena in Highly-Stressed Steels Resulting From Diffused Hydrogen. I.** Class. *Werkstoffe und Korrosion,* v. 6, no. 5, May 1955, p. 237-245.

Appearance of cracks of a predominantly transcrystalline character in ordinary and alloyed heat treated steels used in condensation units of high-pressure plants and experiments made to get these appearances under laboratory conditions. Photographs, diagrams, graphs. 13 ref. (R1, AY, ST)

327-R. (German.) **Corrosion Inhibitors.** Hellmuth Fischer. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 350-357.

Classification and mechanics of inhibitors; factors which influence the effect of inhibitors. Graphs, tables, diagrams. 21 ref. (R10)

328-R. (German.) **The Problem of Stress-Corrosion of Homogeneous Solid Solutions. III. Dependence of Stress-Corrosion Sensitivity on Solid Copper-Gold and Silver-Gold Solutions on the Gold Content and Relationship to the "Solid-Solution Effect".** Ludwig Graf and Jürgen Budke. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 378-385.

Effect of aqua regia, potassium cyanide solution, reagents which do not attack gold and mercury on stress corrosion of above solid solutions and on the change of strength properties under the influence of a liquid metal and chemical reagents. Graphs, tables. 20 ref. (R1, Cu, Ag, Au)

329-R. (German.) **The Difference in Potential Within the Passive Layer of Iron.** Klaus J. Vetter. *Zeitschrift für physikalische Chemie (Frankfurt),* v. 4, nos. 3-4, June 1955, p. 165-174.

Theoretical and experimental determination of the potential difference at the oxide-electrolyte phase boundary; Flade potential and corrosion; possible effect of a high-energy oxide or of increased corrosion on the Flade potential. Diagram. 11 ref. (R10, Fe)

330-R. (German.) **The Passivity of Iron in Neutral and Slightly Acid Solutions.** K. G. Weil and K. F. Bonhoeffer. *Zeitschrift für physikalische Chemie (Frankfurt),* v. 4, nos. 3-4, June 1955, p. 175-191.

Passivation of iron and its behavior in solutions varying from 2 to 6 pH. Graphs, tables, diagram. 11 ref. (R10)

331-R. (Italian.) **Research on the Corrosion of Tin and on Its Protective Action on Iron.** G. Bianchi. *Metallurgia italiana,* v. 47, no. 5, May 1955, p. 216-219.

Corrosion tests on tin and tin with

steel in solutions of sulfuric, oxalic, tartaric, malic, citric and salicyclic acid, with and without additions of chlorides and sulfates; investigates tin-2% lead alloys. Graphs, photographs. 1 ref. (R5, Sn)

332-R. (Italian.) **Some Observations on Evaluating the Corrosion Behavior of Tin-Plate.** W. E. Hoare. *Metallurgia italiana,* v. 47, no. 5, May 1955, p. 220-221.

Tests on use of tin plate for packaging purposes. Photograph graphs. 7 ref. (R general, T10, Sn)

333-R. (Russian.) **Electrochemical Theory of Corrosion and Ways of Increasing the Corrosion Resistance of Alloys.** N. D. Tomashov. *Uspekhi Khimii,* v. 24, no. 4, 1955, p. 453-470.

Effect of structural heterogeneity; circumstances under which passive state of metal appears; corrosion resistance increased by alloying with cathodic additions. Graphs, diagrams, tables. 41 ref. (R1, R10, ST, Cr, Cu, Ni, Zn, Al, Mn, Be, Mg)

334-R. Acid Contamination as a Source of Error in Boiling Nitric Acid Test for Corrosion-Resistant Steels. Robert J. Bendure. *ASTM Bulletin,* 1955, no. 207, July, p. 76-77.

High and erratic penetration rates obtained when testing area inadvertently contained hydrofluoric acid fumes. Tables. (R11, SS)

335-R. Corrosion Monitoring for Chemical Plant. C. Edeleanu. *Corrosion Technology,* v. 2, July 1955, p. 204-208.

Use of a simple valve voltmeter and a multipoint recorder or indicator to get continuous potential measurements. Anodic protection of equipment containing sulfuric acid. Graphs, diagrams, tables. 4 ref. (R6, R10)

336-R. The Corrosion Section of the British Iron and Steel Research Association. K. H. Gibbons. *Corrosion Technology,* v. 2, July 1955, p. 209-212.

Laboratory facilities and work in progress on atmospheres, soil and aqueous corrosion and protective coatings. Diagram, photographs. (R general, A9)

337-R. The Corrosion Resistance of Low-Alloy Steels. J. C. Hudson and J. F. Stanners. *Iron and Steel Institute, Journal,* v. 180, July 1955, p. 271-284 + 2 plates.

A systematic investigation of the effects of small amounts of alloying elements on the corrosion resistance of mild steel. Tables, diagrams, graphs, photographs. 6 ref. (R11, AY)

338-R. Corrosion in Nuclear Power Plants. *Mechanical Topics,* v. 16, no. 3, 1955, p. 2-4.

Requirements of materials to be used in nuclear power plants and the tests made to prove them satisfactory. Photographs, diagram, table. (R general, T25)

339-R. Corrosion of Beryllium in Air. James L. English. Paper from "The Metal Beryllium". American Society for Metals, p. 530-532.

Resistance of beryllium to corrosion at room temperature when in various worked forms, such as extrusions and machined specimens. (R3, Be)

340-R. Corrosion of Beryllium in Water. James L. English. Paper from "The Metal Beryllium". American Society for Metals, p. 533-548.

Aqueous corrosion of beryllium in high-purity water systems at temperatures below 100° C. Effect of pH, temperature, dissolved gases, dissolved ions and corrosion control methods. Tables, graph. 22 ref. (R4, Be)

341-R. Corrosion of Beryllium in Liquid Metals. R. F. Koenig. Paper from "The Metal Beryllium". American Society for Metals, p. 549-554.

Results of corrosion tests of beryllium in liquid bismuth, bismuth-lead eutectic alloy, bismuth-lead-tin-eutectic alloy, gallium, lead, lithium, mercury and sodium. Tables, graph. 10 ref. (R6, Be)

342-R. (French.) **Electrochemical Behavior of Nickel. Voltage-pH Equilibrium Diagram of the Nickel Water System at 25° C. Corrosion of Nickel; Nickel Plating; Nickel Storage Batteries.** E. Deltombe, N. de Zoubov and M. Pourbaix. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 23, June 1955, 28 p.

Electrochemical behavior of nickel studied by means of a voltage-pH equilibrium diagram. Conclusions drawn relative to corrosion, general properties of nickel and its oxides, electrochemical and chemical deposition, and to the functioning of nickel alkaline storage batteries. Tables, diagrams. 61 ref. (R1, Ni)

343-R. (German.) **Acid Resisting Steels in the Production of Wood-Vinegar.** L. Wetternik and H. Zitter. *Werkstoffe und Korrosion,* v. 6, no. 6, June 1955, p. 282-287.

Best results achieved by a steel alloyed with 27% chromium, 4 to 5% nickel, and 1 to 5% molybdenum. Diagram, graphs, tables. (R7, Cr, Ni, Mo, AY)

344-R. (Italian.) **Influence of Heating on Mechanical Properties and Corrosion Resistance of P-AG5.** D. Gualandi and G. Luft. *Alluminio,* v. 24, no. 3, May 1955, p. 229-240.

Heating of aluminum-magnesium alloy resulted in decreased resistance to corrosion under stress. Graphs, micrographs, tables, diagram. 14 ref. (R1, Q general, Al)

345-R. (Polish.) **Determination of Electrochemical Indexes of the Micro-Segregation in Metals.** Antoni Piotrowski. *Archiwum Gornictwa i Hutnictwa,* v. 2, no. 3, 1954, p. 373-415.

Investigation of the phenomenon of potential oscillation in "mono-metal" cells. Precise relation between the visible oscillations of the current seen in the curves and the microsegregation stated by the influence of homogenizing annealing of the test pieces. Graphs, diagrams, micrographs, tables. 27 ref. (R1)

346-R. (Russian.) **Electrode Potentials of Ternary Alloys Containing Intermetallic Compounds.** V. A. Iurkov and M. A. Krishtal. *Zhurnal Fizicheskoi Khimii,* v. 29, no. 5, May 1955, p. 778-780.

Measurements of electrode potentials of alloys provide data for predicting corrosion behavior. Micrographs, graph. 6 ref.
(R1, Cd, Pb, Sb, Sn, Zn)

347-R. Cathodic Protection Installations at Kwinana. K. A. Spencer. *Corrosion Prevention and Control,* v. 2, July 1955, p. 23-27.

Protection of petroleum refining installations submerged in sea water. Photographs, diagrams. (R10)

348-R. Kinetics of Nickel-Sulfur and Steel-Sulfur Reactions. Andrew Dravnieks. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 435-439.

Reaction of nickel with molten sulfur between 205 and 445° C. follows the parabolic law. The activation energy (Arrhenius) below approximately 300° C. is in excess of 50 kcal.; above this temperature, it is about 20 kcal. Graphs. 32 ref. (R6, P12, Ni, ST)

349-R. The Oxidation of Iron-Nickel Alloys. R. T. Foley, J. U. Druck and R. E. Fryxell. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 440-445.

High-temperature (600 to 900° C.) oxidation of 42% nickel alloy. Reaction products examined by metallographic and electron diffraction techniques, as well as chemical analyses after stripping. Tables, graph, micrographs. 13 ref.
(R2, Fe, Ni)

350-R. High Temperature Corrosion Rates of Several Metals With Nitric Oxide. Milton Farber, Alfred J. Darnell and Donald M. Ehrenberg. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 446-453.

Corrosion rates determined for iron, tantalum, tungsten, molybdenum, nickel, copper, silver and the alloys Inconel and stainless steel. Tables, diagrams, graphs. 13 ref. (R9, Fe, Ta, W, Mo, Ni, Cu, Ag, Ni-e, SS)

351-R. High Pressure Oxidation of Metals. Oxidation of Metals Under Conditions of a Linear Temperature Increase. John P. Baur, Donald W. Bridges and W. Martin Fassell, Jr. *Electrochemical Society, Journal,* v. 102, Aug. 1955, p. 490-496.

Studies on tantalum, niobium, molybdenum, copper, zirconium, magnesium, titanium and tungsten to develop a method whereby oxidation behavior can be surveyed quickly and the pressure sensitive region found. Graphs, tables. 23 ref. (R2, Ta, Cb, Mo, Cu, Zr, Mg, Ti, W)

352-R. Controlling Corrosion With Cathodic Protection. H. R. Ludeker. *Metal Progress,* v. 68, Aug. 1, 1955, p. 86-90.

Corrosion, which costs our country billions of dollars each year, can be controlled by interposing an electrical resistance in the corrosion circuit or by limiting the difference in potentials of the anodic and cathodic areas. Photographs, diagram. (R10)

353-R. Corrosion of Stainless and Aluminum in Contact With Titanium. (Digest of "Corrosion of Stainless Steel and Aluminum Alloys in Contact With Titanium", by C. Braithwaite; *Royal Aircraft Establishment Technical Note Met.* 192, Feb. 1954, 11 p.) *Metal Progress,* v. 68, Aug. 1, 1955, p. 182, 184.

Tests by intermittent exposure to sea-water spray for one year.
(R4, SS, Al, Ti)

354-R. Progress Report on Accelerated Corrosion Tests for the Performance of Plated Coatings. W. L. Pinner. *Plating,* v. 42, Aug. 1955, p. 1039-1043.

Report on work to furnish the metal finishing industry with a valid test which is reproducible and will predict service behavior of plated coatings. Photographs. 2 ref.
(R11, L17)

355-R. The Oxidation of Metals. U. R. Evans. *Reviews of Pure and Applied Chemistry,* v. 5, Mar. 1955, p. 1-21.

Conditions determining oxidation, movement of vacancies, effect of minor constituents, cation or anion mobility, boundary reaction, tunnel effect mechanism and equations representing the effect of cavities or obstructions, and lateral growth. Graph. 64 ref. (R2)

356-R. (German.) **Corrosion and Corrosion Protection.** H. Mohler. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 6, June 1955, p. 204-206.

Statistical analysis of corrosion damage on different materials; preventive methods. 6 ref. (R general)

357-R. (Pamphlet.) **The Use of Volatile Corrosion Inhibitors as a Preservative Medium for Long Term Storage of Ordnance Material. IV. Results After Five Years of Exposure.** PB 111608, 31 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

Tests were conducted with ferrous and nonferrous ordnance items stored in three petrolatum-type preservatives or wrapped in papers impregnated with two volatile inhibitors. (R10)

358-R. Cavitation-Pitting by Instantaneous Chemical Action From Impacts. Irving Taylor. *American Society of Mechanical Engineers, Paper No.* 54—A-109, 1954, 11 p.

Some ideas and contentions on the cavitation pitting that occurs when the impacts release hydroxyl radicals in water or release ions in liquid metals. Table. (R2)

359-R. Resistance of Tubular Materials to Sulphide-Corrosion Cracking. J. P. Fraser and R. S. Treseder. *ASME, Transactions,* v. 77, Aug. 1955, p. 817-822; disc., p. 822-825.

Laboratory test procedure for rating alloys as to their resistance to sulphide-corrosion cracking. Tables, photographs. 7 ref. (R11)

360-R. The Sulphurization-Resistant Property of Spheroidal Graphite Cast Iron at High Temperatures. Masakazu Shiozawa and Hiroshi Nakai. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 12-14.

No significant difference exists between spheroidal graphite and ordinary cast iron; the shape of graphite exerts no serious affect, but alloy elements, which dissolve in matrices, seriously affect the resistant property. Tables, micrograph. 2 ref. (R9, CI)

361-R. The Pertechnetate Ion as an Inhibitor of the Corrosion of Iron and Steel. G. H. Cartledge. *Corrosion,* v. 11, Aug. 1955, p. 335-342.

A study of the inhibition of corrosion of electrolytic iron, mild steel and cast iron in aerated water by the use of low concentrations of potassium pertechnetate. Tables, photographs, graphs. 17 ref. (R10, CI, Fe, CN)

362-R. Design and Application of Corrosion Current Measuring Instruments. Donald L. Ham. *Corrosion,* v. 11, Aug. 1955, p. 343-346.

Three principal kinds of instruments used to measure currents associated with corrosion. Circuit diagrams. (R11)

363-R. Design Against Atmospheric Corrosion. Henry T. Rudolf. *Corrosion,* v. 11, Aug. 1955, p. 347-350.

Series of observations, suggestions and recommendations, based on practical experience, for construction of metallic surfaces exposed to corrosion. Diagrams. (R3, Fe, ST)

364-R. Stress Corrosion Cracking of Hardenable Stainless Steels. F. K. Bloom. *Corrosion,* v. 11, Aug. 1955, p. 351-361.

Results of tests exploring effects of heat treatment on susceptibility of various stainless steels to corrosion cracking in a variety of corrosive media. Photographs, diagrams, tables, graphs, micrographs. 11 ref. (R1, SS)

365-R. The Electrochemistry of Inhibitor Action. R. B. Mears. *Corrosion,* v. 11, Aug. 1955, p. 362-364.

Electrical terms used to explain inhibiting action of substances and to show what properties are desirable in an inhibitor. The mechanism by which sodium chromate and sodium hexametaphosphate function as inhibitors. Graphs, table. 3 ref. (R10)

366-R. (French.) **Insulating Coatings and Their Influence on the Cathodic Protection of Ferrous Metals by Means of Magnesium Anodes.** B. Raclot. *Métaux, Corrosion-Industries,* v. 30, no. 358, June 1955, p. 258-261.

Importance of the combination of coating properties and cathodic protection, depending upon the nature of the insulating material and conditions of application. Tables, graphs. (R10, ST)

367-R. (German.) **Electrochemical Investigations of the Corrosion of Alpha-Iron Monocrystals in Dilute Acids.** Hans-Jürgen Engell. *Archiv*

für das Eisenhüttenwesen, v. 26, no. 7, July 1955, p. 393-404.

Effect of type and concentration of acid, temperature and crystal orientation on rate of corrosion; study of etched surface structures, interpretation of test results. Graphs, diagrams, tables, micrographs. 18 ref. (R5, M26, Fe)

368-R. (German.) **Practical Application of Zinc Anodes for the Cathodic Protection of Pipelines.** B. Trautmann. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 649-651.

Current required for anodes under different soil conditions; properties of zinc anodes; types of backfill for different soils and factors affecting the economy of this method. Tables, graphs, diagram. 2 ref. (R10, CN)

369-R. (German.) **Behavior of Fine Zinc Alloys Under Tropical Conditions.** W. Wolf. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 655-658.

Intercrystalline corrosion of pressure cast $ZnAl_4$ and $ZnAl_4Cu$ alloys under hot humid conditions, resulted primarily from lead, cadmium and tin; embrittlement and change in dimensions due to aging; effect of temperature on mechanical properties and of humidity and temperature changes on surface corrosion; methods of protecting the surfaces of zinc alloys against corrosion. Photographs, graphs. 6 ref. (R3, Q general, Zn)

370-R. (German.) **Short-Time-Tests in a New Test Chamber for Corrosion.** W. Hess. *Werkstoffe und Korrosion,* v. 6, no. 7, July 1955, p. 325-328.

Apparatus which produces a fine, homogeneous fog; advantages and applications. Photographs, tables, diagram. (R11)

371-R. (German.) **On the Mechanism of the Corrosion of Iron in Soils.** T. Markovic, Z. Dugi and B. Sribar. *Werkstoffe und Korrosion,* v. 6, no. 7, July 1955, p. 334-337.

Rate of corrosion depends on pH-value of the soil if the corrosion of the iron takes place under an excess of oxygen. Laboratory experiments with soft steel specimens show that corrosion of iron in unsaturated soils is a reaction of the first order, in water-saturated soils it follows the law of diffusion. Graphs, tables. (R8, Fe)

372-R. Significance of Slime in Causing Corrosion and Mechanisms of Corrosion by Slime Growth. R. S. Wise. *American Society of Mechanical Engineers, Paper No.* 55—S-40, 1955, 8 p. + 1 plate.

Corrosion rate is increased by bacteria in cooling-tower systems by a combination of several mechanisms. Total corrosion rate in the presence of slime may easily be double that in the absence of slime as indicated by controlled laboratory tests. Photographs, graphs, tables. 13 ref. (R1, R4)

373-R. Attack on Metals by Bismuth-Lead-Tin Alloy at Elevated Temperatures. Walter D. Wilkinson. *Argonne National Laboratory (U. S. Atomic Energy Commission),* ANL-5262, Jan. 1955, 73 p.

The alloy 52% bismuth-32% lead-16% tin by wt. does not attack molybdenum at 800° C. or beryllium at 500° C. Aluminum, titanium and zirconium were damaged, iron is insoluble but subject to intergranular attack. Tables, graph, diagrams, photographs, micrographs. 7 ref. (R6, AY, Be, Mn, ST, SS, Ti, Zr)

374-R. The Initial Oxidation of Nickel. Ursula M. Martius. *Canadian Journal of Physics,* v. 33, Aug. 1955, p. 466-472.

Specific features of the oxidation of grain boundaries; tentative explanation of observed phenomena. Micrographs. 9 ref. (R2, Ni)

375-R. Corrosion of Metal Containers. R. K. Sanders. *Corrosion Technology,* v. 2, Aug. 1955, p. 238-242.

Considers tinplate, "blackplate" and aluminum in their roles as structural metals for containers and outlines their corrosion characteristics under varying conditions. Reviews contemporary literature. Photographs. 10 ref. (R general, Sn, Al)

376-R. Dezincification of Brasses in Marine Environments. L. Kenworthy and W. G. O'Driscoll. *Corrosion Technology,* v. 2, Aug. 1955, p. 247-249.

Description, mechanism, effects of alloying elements. Photographs. 25 ref. (R2, R3, Cu)

377-R. The Corrosive Nature of Combustion Gases From Carbon Monoxide Flames Containing Sulphur Oxides. G. Whittingham. *Journal of Applied Chemistry,* v. 5, July 1955, p. 316-322.

Mild steel corrosion was at a maximum from 66 to 70° C. and combustion air humidity had a significant effect. Tables. graphs, diagram. 15 ref. (R9, CN)

378-R. The Kinetics of the Reaction of Elementary Fluorine With Cop-

per Metal. P. E. Brown, J. M. Crabtree, and J. F. Duncan. *Journal of Inorganic and Nuclear Chemistry,* v. 1, June 1955, p. 202-212.

Studied under high vacuum from room temperature to 250° C. and from 6 to 60-mm. mercury pressure. Tables, graphs, diagram. 10 ref. (R6, Cu, Fe)

379-R. Inhibition of Acid Dissolution of Metals. I. Some General Observations. A. C. Makrides and Norman Hackerman. *Journal of Physical Chemistry,* v. 59, Aug. 1955, p. 707-710.

Mechanism for inhibition of metal dissolution and important parameters pointed out. Tables. 17 ref. (R10)

380-R. How Copper-Base Alloys Have Reduced Condenser-Tube Corrosion in Marine Service. C. L. Bulow. *Marine Engineering,* v. 60, Sept. 1955, p. 59-67.

Properties of individual alloys tabulated and their performance in different types of service. Tables, photographs, micrographs. (R3, Cu)

381-R. Cathodic Protection on the Biggest Inch Line. II. N. K. Senatoroff and W. M. Schilling. *Pipe Line News,* v. 27, Aug. 1955, p. 50 + 9 pages.

Details of a $100,000 complete cathodic protection system for 30-in. wrapped gas line. Tables, graphs, diagrams. 6 ref. (R10, ST)

382-R. The Prevention of Corrosion During Storage and Transit. C. F. McCue. *Sheet Metal Industries,* v. 32, no. 340, Aug. 1955, p. 565-569; disc., p. 569-571.

Types of temporary protectives, selection of correct type of protective, causes of failure. Graphs. 3 ref. (R10)

383-R. On Heat and Sulphur-Resisting Alloys. H. Gruber. *Henry Brutcher Translation No.* 918, 21 p. (From *Zeitschrift für Metallkunde,* v. 23, no. 5, 1931, p. 151-157.) Henry Brutcher, Altadena, Calif.

Influence of gaseous sulfur upon nickel and chrome-nickel alloys at elevated temperatures. Factors improving the resistance to the action of sulfur; physical properties of layer of scale; general significance of physical factors in regard to the resistance to gaseous sulfur. Graphs, micrographs, tables. (R9, SG-h)

384-R. On One Form of Intergranular Corrosion in Welds in Stabilized 18-8 Steel (Knife-Line Attack). Yu. I. Kazennov. *Henry Brutcher Translation No.* 3552, 5 p. (From *Avtomaticheskaya Svarka,* v. 9, no. 2, 1955, p. 91-93.) Henry Brutcher, Altadena, Calif.

Study of conditions for incidence and ways of suppressing intergranular knife-line attack in titanium and columbium-stabilized 18-8 steels. Photographs, diagrams, table. 2 ref. (R2, SS)

385-R. Water Corrosion of Structural Materials. A. H. Roebuck. Paper from "Fifteenth Annual Water Conference, Proceedings". Engineer's Society of Western Pennsylvania, p. 165-177; disc., p. 177-185.

Corrosion mechanisms and tests on various metals and alloys. Tables, photographs, diagrams, graphs. 7 ref. (R4)

386-R. A New Approach in Corrosion Prevention for Cooling Water Systems. H. Lewis Kahler and Charles George. Paper from "Fifteenth Annual Water Conference, Proceedings". Engineer's Society of Western Pennsylvania, p. 18.-193; disc., p. 193-197.

Use of soluble zinc or zinc coatings to supplement the action of corrosion inhibitors. Tables. 5 ref. (R10, L16)

387-R. (German.) **Process for the Prevention of Corrosion—General Report.** Willi Machu. *Chemie-Ingenieur-Technik,* v. 27, no. 7, July 1955, p. 403-409.

Economic importance of corrosion problems and considerable variety of corrosion phenomena, methods used in technology for protection against corrosion, summary of lectures held at the "Corrosion Convention" 1954 in Frankfurt/Main. 16 ref. (R general)

388-R. (German.) **The So-Called Well-Water Blackening of Aluminum and Its Prevention.** D. Altenpohl. *Metalloberfläche,* Ausgabe A, v. 9, no. 8, Aug. 1955, p. 118-121.

Effect of hard tap and well water on pure aluminum and aluminum alloys, chemical preventive measures, methods of testing an aluminum surface for its susceptibility to blackening, protective effect of a bohmite film. Micrographs, photographs, table. 4 ref. (R4, Al)

389-R. (German.) **Contribution to the Corrosion-Chemical Behavior of Titanium.** K. Jordan and R. W. Fischer. *Technische Mitteilungen Krupp,* v. 13, no. 2, May 1955, p. 44-47.

Corrosive effects of acids, hydroxide salts and gaseous halogens on titanium as functions of temperature and time. Tables. 8 ref. (R6, R7, R9, Ti)

390-R. Copper Alloy's Corrosion Resistance to Ammonia Improved by Good Design, Stress Relieving. I. S. Levinson. *Corrosion,* v. 11, Sept. 1955, p. 365.

When exposed to 14% ammonium hydroxide at 212° F., heat treated copper was superior, more severe attack was in the vapor phase. Tables, photograph. (R6, Cu)

391-R. Principles Applicable to the Oxidation and Corrosion of Metals and Alloys. W. W. Smeltzer. *Corrosion,* v. 11, Sept. 1955, p. 366-374.

Theory for formation of compact films on pure metals is well developed. General principles of films on alloys are made for aluminum alloys. Tables, graphs, diagrams. 59 ref. (R1, R2, Al)

392-R. The Porosity of the Aluminum Surface Investigated by the Repetitive Oscillographic Method. W. Machu, E. M. Khairy and M. K. Hussein. *Corrosion,* v. 11, Sept. 1955, p. 375-378.

Anodic passivity of aluminum, studied in a variety of electrolytes, shows that two types of reactions occur: electrochemical and chemical. Tables, graph, circuit diagram, oscillogram. 4 ref. (R11, Al)

393-R. Corrosion of Materials Subjected to Locomotive Smoke and Funnel Blast. T. Marshall and R. M. Sinclair. *Corrosion,* v. 11, Sept. 1955, p. 379-382.

Tests on various constructional materials and protective coatings exposed to smoke, steam and direct funnel blasts indicate that molybdenum-bearing austenitic stainless steel and vitreous-enamelled steel are highly resistant to deterioration. Tables. 4 ref. (R9, R4, SS)

394-R. Atmospheric Galvanic Couple Corrosion. K. G. Compton, A. Mendizza, and W. W. Bradley. *Corrosion,* v. 11, Sept. 1955, p. 383-392.

Measurements of weight losses of couples in marine, industrial and severe tropical atmospheres to predict their probable relative behavior. Tables, graphs, diagram, photographs. 20 ref. (R3, R1)

395-R. Countermeasures for Control of Internal Corrosion of a Tanker Ship. Charles P. Dillon. *Corrosion,* v. 11, Sept. 1955, p. 393-405.

Recommends concurrent inhibition of cargo with an oil-soluble inhibitor and treatment of empty tanks with a soluble-oil inhibited salt water wash. Reduction of corrosion up to 75% is expected with a net annual savings on the order of $65,000. Photographs, tables, diagram. 14 ref. (R7, R10)

396-R. Valves for Corrosive Fluids. E. G. Holmberg. *Corrosion,* v. 11, Sept. 1955, p. 406-414.

Presents method for selection of valves for control of corrosive fluids; means of selecting suitable alloys and case histories of valve failures from corrosion are given and analyzed. Tables, diagrams, photographs. (R6, R7, T7, AG-g)

397-R. Fretting Corrosion on a Screwed Joint Under Prolonged Fatigue Loading. J. E. Field. *Engineer,* v. 200, Aug. 26, 1955, p. 301-303.

Tests on the reduction of the inherent fatigue resistance of a part subject to fluctuating stresses by fretting corrosion. Photographs, diagrams, table. (R1, Q7)

398-R. Corrosion by Liquid Metals. Leo F. Epstein. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/119, July 1955, 22 p.

Interest in liquid metals, as heat transfer fluids, has brought about need for information on corrosion by these materials. Photographs, tables, diagrams, graphs. 3 ref. (R6)

399-R. Fretting and Fretting Corrosion. *Lubrication,* v. 41, Aug. 1955, p. 85-96.

Scope, detection, mechanism. Effects of lubrication and other factors which influence fretting. Photographs, diagram, tables. 26 ref. (R1)

400-R. Recent Developments in Chromium Diffusion. III. Application and Properties of Chromised Metals. R. L. Samuel, N. A. Lockington and H. Dorner. *Metal Treatment and Drop Forging,* v. 22, Aug. 1955, p. 336-340.

Properties of chromized steels including corrosion, heat and wear-resistance. Applications of such components. Graphs, tables. 9 ref. (R general, Q9, L15, Cr)

401-R. Aluminum Corrosion Control in Refrigeration Service. R. L. Hadley. *Refrigerating Engineering,* v. 63, Aug. 1955, p. 40-43, 100.

Mechanism of pitting corrosion of aluminum and other corrosion problems; control measures. Graph, diagrams, photographs. 6 ref. (R2, Al)

402-R. A Rust-Resistance Test for Tinplate. S. C. Britton and D. G. Michael. *Sheet Metal Industries*, v. 32, no. 340, Aug. 1955, p. 576-580.

Tin Research Institutes new method of porosity measurement for estimating resistance. Micrographs. 4 ref. (R11, Sn)

403-R. (German.) **Corrosion and Protection Against Corrosion in Shipbuilding.** K. Sautner. *VDI Zeitschrift*, v. 97, no. 22, Aug. 1, 1955, p. 747-752.

Causes of corrosion inside and outside a ship and preventive measures by cathodic means, chemical inhibitors and removal of moisture from storage tanks. Graph, photographs, table, diagrams. 28 ref. (R10)

404-R. (Russian.) **Methods of Corrosion Protection of Modern Anti-friction Alloys.** B. V. Losikov. *Vestnik Mashinostroeniia*, v. 35, no. 8, Aug. 1955, p. 58-60.

Corrosion process of copper, cadmium, lead and tin alloys; factors inducing corrosion; methods of protection. Tables. 9 ref. (R10, Cd, Cu, Pb, Sn)

405-R. (Russian.) **Laboratory Installation for the Service Testing of Pump Piston Rods for Corrosion Fatigue.** R. A. Bagramov. *Zavodskaia Laboratoriia*, v. 21, no. 7, July 1955, p. 864-866.

Testing simulates actual oil-well pumping conditions, including variable asymmetric loads. Diagrams, graphs. (R1, R11, ST)

406-R. (Book.) **Bibliographic Survey of Corrosion, 1950-1951.** Publication No. 55-4. 435 p. 1955. National Association of Corrosion Engineers, 1061 M & M Building, Houston 2, Texas. $12.50 ($10.00 to NACE members).

A compilation of corrosion abstracts from English and foreign journals. (R general)

407-R. (Book.) **Water Treatment Prevention of Scale in Sea Water Distillation.** Report PB 111569. 104 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $3.25.

Thermocompression stills, used with some stabilized sea waters, show promising performance in a citric acid cycle; sea water composition shows considerable variation. (R4)

408-R. Effect of Tempering Temperature on Stress-Corrosion Cracking and Hydrogen Embrittlement of Martensitic Stainless Steels. Peter Lillys and A. E. Nehrneberg. *American Society for Metals, Transactions*, v. 48, *Preprint No.* 30, 1955. 27 p.

Tempering at about 500° F. provides minimum susceptibility to cracking by embrittlement for high levels of hardness, while maximum susceptibility to stress-corrosion cracking and embrittlement results between 800 and 1000°F. Delta ferrite minimizes the cracking tendency by narrowing the tempering range which produces susceptibility, and by interfering with crack propagation. Tables, photographs, micrographs, graphs. 22 ref. (R1, Q23, J29, SS)

409-R. Corrosion Resistant Aluminum Above 200° C. J. E. Draley and W. E. Ruther. *Argonne National Laboratory (U. S. Atomic Energy Commission)*, ANL-5430, July 1955, 37 p.

Alloy of 1% nickel in 2S aluminum is stable to 200° C. and above. Use and fabrication. Tables, graph, diagrams, photographs, micrographs. 7 ref. (R general, Al)

410-R. Reducing the Cost of Corrosion in Canada. H. P. Godard. *Chemistry in Canada*, v. 7, Sept. 1955, p. 35-38.

More common forms of corrosion, general principles of control, means by which industry can reduce its annual loss. Diagrams. (R general)

411-R. Corrosion Research Laboratories. V. Battelle Memorial Institute, U.S.A. Charles L. Peterson, Frederick W. Fink and Robert S. Peoples. *Corrosion Technology*, v. 2, Sept. 1955, p. 270-274.

Organization and objectives of Battelle and its facilities for studying corrosion under high temperature and pressure, erosion-corrosion, corrosion resulting from molten salts, mechanism and electrochemistry of corrosive attack and inhibition of corrosion by chemical means. Photographs. (R general, A9)

412-R. Staining of Engineering Components. R. Graham. *Corrosion Technology*, v. 2, Sept. 1955, p. 275-277.

Consider the stain stage of rusting, because this is period at which the maximum amount of information on rusting process might be obtained. Photograph. 7 ref. (R2, Fe)

413-R. The Corrosion of Aluminum and Its Alloys. C. Groot and R. M. Peekema. *Hanford Atomic Products Operation, (U. S. Atomic Energy Commission)*, HW-36692, May 1955, 36 p.

Flow Cup Laboratory was estab-

lished to screen aluminum alloys for corrosion in pile water as measured by weight loss, solution potentials and galvanic currents. Photographs, tables, graph. 4 ref. (R4, Al)

414-R. Effect of Thiourea Compounds on Dissolution Rate of Iron and Mild Steel. A. C. Makrides and Norman Hackerman. *Industrial and Engineering Chemistry,* v. 47, Sept. 1955, pt. 1, p. 1773-1781.

Acceleration is attributed to hydrogen sulfide produced by cathodic reduction of these compounds, while inhibition is considered to be result of retardation of the anodic process. Graphs, tables, diagram. 29 ref. (R6, R10, Fe, AY)

415-R. Kinetics and Mechanism of the Oxidation of Molybdenum. M. Simnad and Aija Spilners. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Sept. 1955, p. 1011-1016.

Rates of formation of different oxides on molybdenum, in pure oxygen at one atmosphere pressure, have been determined between 500 and 770° C. They grow almost entirely by diffusion of oxygen anions. Graphs, diagram. 16 ref. (R2, Mo)

416-R. Metal Coatings on Steel in Contact With Aluminium Alloys: Some Comparative Corrosion Tests. S. C. Britton and R. W. de Vere Stacpoole. *Metallurgia,* v. 52, no. 310, Aug. 1955, p. 64-70.

Steel nuts and screws, coated with zinc, cadmium or tin-zinc alloy, were tested on assemblies of five different aluminum alloys. Tin-zinc alloy performs best. Photographs, tables. 5 ref. (R11, Al, Cd, Zn, Sn)

417-R. Corrosion. A. H. Roebuck. Paper from "The Reactor Handbook". v. II. Engineering. AECD-3646. Technical Information Service, U. S. Atomic Energy Commission. Available from Superintendent of Documents, U. S. Government Printing Office, p. 193-233.

Selection of materials for water-cooled reactor systems involves establishing the effect of environment on corrosion of material and the effect of contamination by that material on the environment. Photographs, graphs, tables. 128 ref. (R general)

418-R. Corrosion Testing Facility and Disassembly Equipment. H. G. Duggan and D. T. Jones. Paper from "Fourth Annual Symposium on Hot Laboratories and Equipment". TID-5280. Office of Technical Services, U. S. Department of Commerce, p. 64-77.

Irradiates corrosion test specimens at constant pressure and temperature. Diagrams, photographs. (R11)

419-R. (Czech.) **Choice of Materials and Surface Protections for Tropical Climate.** K. Barton. *Strojirenstvi,* v. 5, no. 6, June 1955, p. 463-466.

Corrosion of metallic parts through atmospheric factors, including tropical moisture, rain and light; comparison of nickel and chromium-plating and zinc, cadmium and organic coatings; evaluation of parts made of stainless steel, zinc, copper, silver, aluminum and magnesium alloys. Table. 10 ref. (R3, SS, Cu, Zn, Al, Mg)

420-R. (French.) **Electrochemical Behavior of Tin Voltage-pH Equilibrium Diagrams of the Tin-Water System at 25° C. Corrosion of Tin. Electrolytic and Chemical Tinning.** E. Deltombe, N. de Zoubov and M. Pourbaix. *Centre Belge d'Etude de la Corrosion, Rapport Technique,* no. 25, 1955, 24 p.

Free enthalpies of standard formation at 25° C., equilibrium reactions and formulas, interpretation of diagram with respect to the stability of tin and its oxides, corrosion and tin-plating. Tables, diagrams. 45 ref. (R4, L17, P15, Sn)

421-R. (German.) **The Corrosion of Alloyed Steels and Nickel Alloys by Phosphoric Acid.** Joh. Bünger. *Werkstoffe und Korrosion,* v. 6, nos. 8-9, Aug.-Sept. 1955, p. 369-374.

At high temperatures and concentrations the corrosion by phosphoric acid is so vigorous that the 70% nickel, 30% molybdenum alloy only is unaffected. Below 100° C., chromium-nickel steels are usually resistant. Graphs, tables. 9 ref. (R6, SS, Ni, Mo)

422-R. (German.) **Investigation of the Stress-Corrosion of Alpha Brass in Ammonia Vapors. I. Statistical Investigation of the Influence of Crystal Structure of the Life of Ring Specimens.** Franz Aebi. *Zeitschrift für Metallkunde,* v. 46, no. 8, Aug. 1955, p. 547-551.

Stress-corrosion characteristics of brass, effect of heat treatment on the improvement of specimen life, influence of impurities on the corrosion resistance. Tables, diagrams, photographs, X-ray diffractograms. 17 ref. (R1, R9, Cu)

423-R. (Russian.) **Methods of Testing Stainless Steels for Their Tendency to Intercrystalline Corrosion.** G. L. Shvarts, I. I. Kazennov and E. I. Astrov. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 922-930.

To show the inadequacies of ac-

cepted methods, tests were made on welded joints in sulfuric and nitric acids and other corrosive media. Resistance to corrosion is demonstrated on steels subjected to boiling acid media. Diagrams, tables, micrographs. (R11, R1, SS)

424-R. (Russian.) **Problem of Accelerating the Tendency of Stainless Austenitic Steels to Intercrystalline Corrosion.** I. L. Rozenfel'd, Z. A. Vrutsevich, E. I. Titkova and M. V. Beganov. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 934-936.

Comparison of sulfuric acid plus copper sulfate, and other combinations, in one and two-day tests. Micrographs. 6 ref. (R5, R11, SS)

425-R. (Russian.) **Methods of Testing Stainless Steels for Intercrystalline Corrosion.** A. V. Shreider. *Zavodskaia, laboratoriia,* v. 21, no. 8, Aug. 1955, p. 937-940.

Effect of ratio of titanium to carbon, anode etching in acids. Graphs. 10 ref. (R11, R2, SS)

426-R. (Russian.) **Methods of Determining the Total Corrosion Resistance of Welded Joints of Stainless Steel in Boiling Nitric Acid.** B. I. Medovar and N. A. Langer. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 941-944.

Microstructure revealed by electrolytic etching in a solution of oxalic acid. Diagram, table, micrographs. 10 ref. (R11, M27, SS)

427-R. **Effects of Chemical Composition and Heat Treatment Upon the Microstructure and Corrosion Resistance of AISI Types 309 and 310.** D. J. Carney and E. R. Rosenow. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 8, 1955, 21 p.

Samples, with varying carbon and nitrogen contents, were subjected to different solution annealing treatments and cooling rates. Effects of carbon and nitrogen on intergranular corrosion restistance showed that variations in the processing affected microstructure to such an extent that in some cases heats containing higher carbon contents yielded improved intergranular corrosion resistance. Tables, graphs, micrographs. 4 ref.
(R2, M27, J general, SS)

428-R. **The Evaluation of Corrosion Resistance for Gas-Turbine-Blade Materials.** W. E. Young, A. E. Hershey and C. E. Hussey. *ASME, Transactions,* v. 77, Oct. 1955, p. 985-994.

Surface analysis of gas-turbine-blade material before and after exposure to the combustion products of residual fuel oils, demonstrates corrosive effect of these products; a measurable indication may be obtained in a fraction of the testing time required to produce appreciable weight loss. Diagrams, photographs, graphs, tables. 10 ref. (R7, SG-h)

429-R. **Recent Investigations of the Mechanics of Cavitation and Cavitation Damage.** Robert T. Knapp. *ASME, Transactions,* v. 77, Oct. 1955, p. 1045-1054.

Water-tunnel investigations into the mechanics of "fixed"-type cavitation and into the probable mechanism through which this type causes material damage. High-speed motion pictures used to study the cavity mechanics; indications of the damage pattern obtained by measuring pitting rate on soft aluminum test specimens. Photographs, diagram, graphs, tables, micrographs. 18 ref. (R2, R11, Al)

430-R. **On the Mechanism of Cavitation Damage.** M. S. Plesset and A. T. Ellis. *ASME, Transactions,* v. 77, Oct. 1955, p. 1055-1064.

New method for producing cavitation damage in the laboratory in which the test specimen has no mechanical accelerations applied to it in contrast with the conventional magnetostriction device. Alternating pressures are generated in the water over the specimen by exciting a resonance in the water cavity. Diagrams, tables, photographs, micrographs. 8 ref. (R2)

431-R. **Corrosion of Metals in High Temperature Water at 500° F. and 600° F.** S. C. Datsko. *Argonne National Laboratory, (U. S. Atomic Energy Commission),* ANL-5354, Oct. 1954, 203 p.

Stainless steel of the 300 series and certain types of zirconium have been found to be satisfactory in all test environments. Tables, photographs, micrographs, diagram.
(R4, SS, Zr)

432-R. **Theory of Corrosion and Passivity of Iron.** W. T. Denholm. *Australasian Engineer,* 1955, Aug., p. 46-56.

Applies pH-potential diagram. Thermodynamic evidence supports view that anodic passivation occurs by adsorption of monolayer of oxygen on metal atoms still in solid lattice. Table, graphs, diagrams. 25 ref. (R10, Fe)

433-R. **Nature of the Passive Film on Iron in Concentrated Nitric Acid.** Herbert H. Uhlig and Thomas L. O'Connor. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 562-572.

Shown to be ferric acid or related higher-valence iron compound and

calculated to form a film of ferric oxide 40 to 125 A. thick. Tables, graphs. 39 ref. (R10, Fe)

434-R. The Nature of Aluminum as a Cathode. M. J. Pryor and D. S. Keir. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 605-607.

Throws new light on high resistance to chloride solutions and on limited sensitivity of corrosion to presence of oxygen. Graph, tables, micrographs. 14 ref. (R5, R9, Al)

435-R. Protective Packaging of Foods Against Moisture Condensation. J. G. Woodroof and E. K. Heaton. *Food Technology,* v. 9, Oct. 1955, p. 510-518.

Mechanism and case histories of rusting of cans. Ways to prevent rusting by protective packaging. Tables, photographs, graph. 18 ref. (R3, R4)

436-R. Corrosion of Aluminium and Aluminium Alloys in Aqueous Solutions at High Temperatures. K. Carlsen. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/880, June 1955, 13 p.

Short tests were run at 230° C. on commercial alloys which would be suitable for power reactors. Tables. 9 ref. (R5, Al)

437-R. The Effects of Repeated Washing of Tinned Steel With Alkaline Solutions on its Resistance to Rusting. S. C. Britton and D. G. Michael. *Journal of Applied Chemistry,* v. 5, Aug. 1955, p. 402-414.

Rate of corrosion of specimens either intermittently or continuously immersed in equivalent caustic alkalinity solutions of sodium hydroxide, carbonate or phosphate with additions of either sodium sulfite, chromate or hypochlorite. Tables, photographs. 8 ref. (R5, Sn, ST)

438-R. The Mechanism of the Inhibition of Corrosion by the Pertechnetate Ion. I. The Origin and Nature of Reaction Products. G. H. Cartledge. *Journal of Physical Chemistry,* v. 59, Sept. 1955, p. 979-984.

In tests with iron and steel, permanently deposited activity is associated with anodic action of active sites, but inhibition is not dependent upon such action. Autoradiogram, tables. 12 ref. (R10, Tc, Fe, ST)

439-R. Better Performance From Metals. J. Harry Jackson. *Southern Pulp and Paper Manufacturer,* v. 18, Sept. 1955, p. 55 + 4 pages.

Intermetallic corrosion control must include avoidance of notch formation. Selection of metals with balanced strength, ductility and toughness, avoiding defects in castings and weldments, are essential for good service life. Stainless steels met these requirements. Table, graphs, micrographs. (R5, R6, R7, Q general, SS)

440-R. Application of Glassy Phosphates for Corrosion Control. George Illig. *Virginia Polytechnic Institute, Bulletin, Engineering Experiment Station Series No.* 102, v. 48, no. 10, Aug. 1955, p. 4-10.

Use and mechanism of action in industrial and municipal water systems. 11 ref. (R10)

441-R. Corrosion Control in Industrial and Steam Power Plants. Ralph M. Lemen. *Virginia Polytechnic Institute, Bulletin, Engineering Experiment Station Series No.* 102, v. 48, no. 10, Aug. 1955, p. 11-16.

Review of corrosion in various items of equipment; control measures. (R4)

442-R. The Use of Lime in Corrosion Control. T. C. Miller. *Virginia Polytechnic Institute, Bulletin, Engineering Experiment Station Series No.* 102, v. 48, no. 10 Aug. 1955, p. 17-19.

Use in controlling corrosive properties of water. (R4, R10)

443-R. Effect of Preheating on Stress-Corrosion Cracking of Steel Weldments. E. Paul Degarmo and I. Cornet. *Welding Journal,* v. 34, Oct. 1955, p. 472S-475S.

Specimens 2 ft. x 2 ft. x ½ in., made of three steels containing from 0.09 to 0.24% carbon and having a 2-ft. submerged-arc weld, were immersed in aqueous solution of 60% calcium nitrate and 3% ammonium nitrate at 225 to 235° F. Tables, photographs, graphs. 3 ref. (R1, K1, ST)

444-R. (French.) **Relation Between Metallographic Structure and Liability to Intercrystalline Corrosion of a Al-5% Cu Binary Alloy.** M. Paganelli. *Alluminio,* v. 24, no. 4, July-Aug. 1955, p. 335-343.

It has been noticed that artificial aging causes discontinuities in the structure of 5% cu aluminum alloy when rolled and heat treated at 160 and 190° C. Consequently the alloy becomes liable to corrosion around the zones of preferential reprecipitation. Tables, micrographs, graph. 7 ref. (R2, N5, Al)

445-R. (French.) **Steels and Alloys Resistant to Corrosion at High Temperatures.** Louis Colombier. *Métaux, corrosion-industries,* v. 30, nos. 359-360, July-Aug. 1955, p. 294-303.

Study of low iron and iron-nickel base alloys with regard to their resistance to oxidation and the action of nitrogen, hydrogen, sulfur compounds, combustion gases and other media. Graphs, tables. (R9, Fe, Ni)

446-R. (Russian.) **Hydraulic Method of Protecting Turbines From Cavitation Erosion.** K. K. Shal'nev. *Vestnik akademii nauk SSSR,* v. 25, no. 8, Aug. 1955, p. 50-52.

Technological methods of protection involve use of high-alloy metals in the building or repair of turbines and turbine parts. However, the hydraulic methods produce better design and smoother, streamlined parts. Diagrams. (R2)

447-R. (Russian.) **Study of the Corrosion of Cadmium and Zinc by the Polarographic Method.** A. Ia. Shatalov. *Zhurnal prikladnoi khimii,* v. 28, no. 9, Sept. 1955, p. 944-949.

Corrosion in chloride and other solutions of pure and technical cadmium and zinc; effect of pH on the potential of the metal; time factor in corrosion. Graphs, tables. 7 ref. (R5, R11, Cd, Zn)

448-R. Preventing Corrosion of Ships With Zinc and Magnesium Protectors. I. D. G. Berwick. *Canadian National Research Council, Technical Information Service Report No.* 44, Sept. 1955, 11 p.

Corrosion mechanisms, application and use of zinc and magnesium anodes. Diagrams. (R10, Zn, Mn)

449-R. Corrosion in the Brewery. III. D. H. Edmonds. *Corrosion Prevention and Control,* v. 2, Sept. 1955, p. 37-42.

Problems and preventive measures in bottle washing machines, pasteurizers, filters and refrigerating apparatus. Photographs. (R4)

450-R. Stress-Corrosion Resistance of Magnesium Alloys. *Corrosion Prevention and Control,* v. 2, Sept. 1955, p. 53-55.

Investigation of effects of both marine and inland atmospheres on materials for aircraft use. Graph, table. (R1, R3, Mg)

451-R. Influence of Specimen Area on the Pitting Probability of Aluminum. P. M. Aziz and Hugh P. Godard. *Electrochemical Society, Journal,* v. 102, Oct. 1955, p. 577-579.

Pit sites are not due to specific local macrodefects in the metal surface but arise in a random fashion through the interaction of myriads of anodic and cathodic elements on the surface between which local action currents flow on initial immersion of the sample in the corrosive environment. Tables, graph. 7 ref. (R2, R4, Al)

452-R. (Japanese.) **On Testing Methods for the Intergranular Corrosion Susceptibility of 18-8 Stainless Steels.** Hideo Togano. *Government Chemical Industrial Research Institute, Tokyo, Reports,* v. 50, no. 8, Aug. 1955, p. 267-278.

Author studies detecting ability of 5% sulfuric, 65% nitric, and nitric-hydrofluoric acid tests; proposes improved measures. Tables, graphs, micrographs, diagrams, 10 ref. (R11, SS)

453-R. Blockage and Corrosion of Plate and Tubular Recuperative Air Heaters. B. Lees. *Institute of Fuels, Journal,* v. 28, Sept. 1955, p. 433-440, 450 + 1 plate.

New method of investigating air-heater corrosion; measures adopted to overcome corrosion and blockage of some tubular and plate-type air heaters. Tables, diagrams, graphs, photographs. 12 ref. (R4)

454-R. Corrosion of Metals in the Tropics. H. R. Ambler and A. A. J. Bain. *Journal of Applied Chemistry,* v. 5, Sept. 1955, p. 437-467.

Atmospheric corrosion of a few common metals studied at more than 20 sites in Nigeria and at some others under various conditions of atmospheric humidity and salinity. Contrary to general belief, corrosion is not generally greater under tropical conditions than in temperate climates. Map, tables, photographs, graphs. 10 ref. (R3)

455-R. Current Status of Corrosion Mitigation Knowledge on Sweet Oil Wells. A Report on Technical Unit Committee T-1C on Sweet Oil Well Corrosion. *Corrosion,* v. 11, Oct. 1955, p. 61-63.

Methods include coating tubing, inhibitors and alloy tubing. Table. (R10, R7)

456-R. Surface Pipe Effect—Cathodic Protection of Oil Well Casing. Jack P. Barrett. *Corrosion,* v. 11, Oct. 1955, p. 415-416.

Potential profile curve shows abrupt anodic slope at base of surface pipe. Graph, photograph. (R10)

457-R. The Effect of Martensite on Sulfide Stress Corrosion Cracking. M. F. Baldy and R. C. Bowden, Jr. *Corrosion,* v. 11, Oct. 1955, p. 417-422.

When martensite begins to show continuity in microstructure, steel becomes susceptible to cracking. Tables, photographs, graphs, micrographs. 1 ref. (R1, M27, ST)

458-R. Basic Essentials for the Reduction of Atmospheric Corrosion. Frank Radecke. *Corrosion,* v. 11, Oct. 1955, p. 437-441.

Selection of paint with respect to environmental severity, surface preparation, dry film thickness and number of coats to be applied. 1 rtef. (R3, L28)

459-R. Microbiological Corrosion of Iron and Steel. David M. Updegraff. *Corrosion,* v. 11, Oct. 1955, p. 442-446.

Review of literature, brief account of historical aspects, discussion of corrosive mechanisms, description of typical examples, suggestions for prevention. 21 ref. (R1, Fe, ST)

460-R. Air Injection for Prevention of Hydrogen Penetration of Steel. W. A. Bonner and H. D. Burnham. *Corrosion,* v. 11, Oct. 1955, p. 447-452; disc., p. 452-453.

Concerned with hydrogen produced by corrosion reaction of steel with hydrogen sulfide at or slightly above atmospheric temperature. Graphs, table. 7 ref. (R7, ST)

461-R. The Corrosion Resistance of Wrought Iron. J. P. Chilton and U. R. Evans. *Iron and Steel Institute, Journal,* v. 181, Oct. 1955, p. 113-122 + 2 plates.

Investigates differences between corrosion behavior of wrought iron and steel, and means by which the iron may be used to best advantage. Diagrams, tables, graphs, photographs. 28 ref. (R general, Fe)

462-R. (French.) **Influence of the Surface State on the Corrosion of Aluminum.** Pierre A. Jacquet. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 7-22.

Tests on cold worked and annealed aluminum described to compare superficial attack of mechanically and electrolytically polished specimens in contact with salt spray, and alkaline and acid solutions. Tables, micrographs, photographs. 12 ref. (R11, Al)

463-R. (French.) **Influence of Purity on the Corrosion of Super-Purity Aluminum.** Frédéric Montariol. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 23-25; disc., p. 26.

Hydrochloric acid (15%) used to test aluminum of purity greater than 99.998%. Photographs. 6 ref. (R11, Al)

464-R. (French.) **On the Behavior of Aluminum Exposed to a Town Atmosphere for Many Years.** Carlo Panseri and Anna Gragnani. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 27-36; disc., p. 36-37.

Chemical analyses, mechanical tests, micrographic examinations made on sheet taken from two 50-yr. old roofs in Rome. Photographs, micrographs, tables. 6 ref. (R3, Al)

465-R. (French.) **The Galvanic Couple, Aluminum-Graphite, in the Corrosion of Light Alloys.** Anna Prati. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 39-47; disc., p. 47.

Results of tests on super-purity aluminum, either insulated or short-circuited with graphite electrode. Photographs, micrographs, tables, graphs, diagrams. 7 ref. (R11, Al)

466-R. (German.) **Electron Microscopy and Electron Diffraction in the Service of Corrosion Research.** W. Feitknecht. *Umschau in Wissenschaft und Technik,* v. 55, no. 18, Sept. 1955, p. 556-558.

Research on the structure of minute corrosion deposits on zinc in sodium chloride solution. Micrographs, photograph. (R11, M21, Zn)

467-R. (German.) **The Chemical Corrosion Behavior of Nonferrous Metals With Respect to the Alkaline Mono-Fluorides and Alkali Hydrofluorides. I. Chemical Corrosion Behavior of Nonferrous Metals With Respect to Solutions of Alkaline Monofluorides and Alkali Hydrofluorides.** W. Köhler. *Werkstoffe und Korrosion,* v. 6, no. 10, Oct. 1955, p. 478-486.

Describes investigation method, material used, testing data and results. Photographs, tables. 18 ref. (R5, EG-a)

468-R. (Russian.) **Electrochemical Behavior of Cadmium in Acid Solutions of Electrolytes. Influence of Haloid Potassium Salt Additions.** Ia. M. Kolotyrkin and L. A. Medvedeva. *Zhurnal fizicheskoi khimii,* v. 29, no. 8, Aug. 1955, p. 1477-1485.

Relation of cadmium solubility to concentration of potassium iodide in sulfuric acid solution. Cathode and anode polarization curves. Graphs, tables. 18 ref. (R5, Cd)

469-R. The Welding of Type 347 Steels. The Results of Nitric Acid and Copper Sulfate-Sulfuric Acid Tests on Modified Type 347 Weld Deposits. Lorin K. Poole. *Arcos Corporation (U. S. Atomic Energy Commission),* NYO-3499, July 1955, 23 p.

Five variations in composition tested to determine suitability for replacing standard composition. Micrographs, tables. 7 ref. (R11, K1, SS)

470-R. An Unusual Case of Corrosion of Aluminum Conduit in Concrete. T. E. Wright. *Engineering Journal,* v. 38, Oct. 1955, p. 1357-1362.

Corrosion of conduit, embedded in a concrete floor, shown to result from calcium chloride in the concrete mix, together with the presence of galvanic currents from contact with embedded steel. Both must be present to allow such corrosion. Photographs, tables, graph. (R1, R6, Al)

471-R. The Kinetics of the Underwater Corrosion of Powdered Magnesium. Eli S. Freeman and Saul Gordon. *Journal of Physical Chemistry,* v. 59, Oct. 1955, p. 1009-1015.

Investigation of atomized and ground powder in presence of nitrogen, helium, carbon dioxide, hydrogen and oxygen. Tables, graphs. 5 ref. (R4, R6, H11, Mg)

472-R. Compressor Station Equipment Corrosion Problems and Remedies. J. C. Berringer. *Pipe Line News,* v. 27, Oct. 1955, p. 55-56, 58-59.

Corrosion mechanism in and preventive measures for equipment using the open water cooling system, after-cooling coils and water tanks, and problems of hydrogen sulfide occurring in gas. (R4, R9)

473-R. (German.) **Corrosion and Corrosion Prevention of Electrical Equipment.** I. B. Müller. *Energietechnik,* v. 5, no. 9, Sept. 1955, p. 406-412.

Causes and mechanisms of corrosion, erosion and cavitation; bacterial corrosion and influence of temperature; method of corrosion measurement and its prevention. Diagrams, micrographs, table. (R general)

474-R. (German.) **Copper-Nickel Alloys as Corrosion Resistant Materials.** A. Schimmel. *Energietechnik,* v. 5, no. 9, Sept. 1955, p. 413-414.

Corrosion resistance of nickel-containing alloys compared with brass and bronze materials as applied to heat transfer purposes. Micrographs. (R general, Cu)

475-R. (German.) **Electrochemical Behavior of Copper-Gold Alloy and the Mechanism of Stress-Corrosion.** Heinz Gerischer and Hans Rickert. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 681-689.

Current density curve of the alloy, influence of mechanical load, stress-corrosion under anodic current, localization of corrosion. Graphs, diagrams, table. 13 ref. (R1, Au, Cu)

SECTION S

INSPECTION and CONTROL

1-S. The B.I.S.R.A. Profiloscope. A. E. Ranger. *Wire Industry,* v. 21, Oct. 1954, p. 1015-1018, 1021.
Instructions for use and interpretation of images obtained with instrument for checking wire drawing dies. Photographs, diagrams. (S14, F28)

2-S. Radiographic Properties of X-Rays in the Two to Six-Million-Volt Range. Charles H. Goldie, Kenneth A. Wright, John H. Anson, Robert W. Cloud and John G. Trump. *ASTM Bulletin,* 1954, no. 201, Oct., p. 49-54.
Theory and equipment for examining thick metal pieces. Graphs, tables. 9 ref. (S13)

3-S. Special Instruments for the Steel Industry. W. A. Black. *Instruments and Automation,* v. 27, Nov. 1954, p. 1786-1791.
Ultrasonic inspection and thickness gaging, X-ray thickness gaging, blooming-mill torque control, open-hearth crane analyses and electrical weighing. Development of special depth and crack indicators. Photographs, diagrams, graph. (S general, ST)

4-S. Instrumentation of Modern By-Product Coke Ovens. E. T. W. Bailey. *Instruments and Automation,* v. 27, Nov. 1954, p. 1815-1817.
Control system, utilizing pneumatic techniques, for fuel-gas pressures, stack draft, exhausters and boosters. Photographs, diagrams. (S18)

5-S. Calibration of a Nickel-Molybdenum Thermocouple. Richard D. Potter. *Journal of Applied Physics,* v. 25, Nov. 1954, p. 1383-1384.
Values of e.m.f. were determined up to 2242° F. Graph, table. 4 ref. (S16)

6-S. How to Check Accuracy of Ultrasonic Flaw Detection. Nicholas Grossman. *Materials & Methods,* v. 40, Nov. 1954, p. 100-101.
Method of setting ultrasonic equipment to detect flaws above a specified minimum size. Photographs, tables, diagram. (S13)

7-S. Radiographic Inspection Assures Sound Pipeline Welds. Harold Hovland. *Oil and Gas Journal,* v. 53, Nov. 15, 1954, p. 223-225, 228, 230.
Advantages, weld control, operator qualifications, radiographic costs. Photographs, tables. 2 ref. (S13)

8-S. ABC's of Ultrasonic Inspection. E. F. Weller, Jr. *Steel Processing,* v. 40, Nov. 1954, p. 706-714.
Principles, equipment, and applications. Diagrams, photographs. 11 ref. (S13, S14, S15)

9-S. Industrial Applications of Atomic Energy. Alfonso Tammaro. *Steel Processing,* v. 40, Nov. 1954, p. 715-722.
Uses of radioisotopes in various industrial and research problems. Principles of various reactors. Diagrams, photographs. (S19, T25)

10-S. (French.) **Industrial Testing by Ultrasonics.** *Métallurgie et la construction mécanique,* v. 86, no. 9, Sept. 1954, p. 653, 655, 657.
Methods and advantages. Drawings. (To be continued.) (S13, S14, S15)

11-S. (German.) **Luster and Luster Impression.** H. D. Schulz-Methke. *Metalloberfläche,* Ausgabe A, v. 8, no. 11, Nov. 1954, p. 161-164.
Methods of determining structure and luster of metal surfaces, importance of objective methods of measuring luster. Diagram. 17 ref. (S15, P17)

12-S. Hardness Tester Sorts Auto Engine Parts. Milton J. Diamond. *Electronics,* v. 27, Dec. 1954, p. 160-161.
Automatic sorter measures hardness of steel rocker arms for automobile engines. Nondestructive test

using magnetic retentivity provides 100% inspection. Photographs, circuits. (S10, Q29, ST)

13-S. Instrumentation in the Iron and Steel Industry. B. O. Smith. *Metal Treatment and Drop Forging,* v. 21, Nov. 1954, p. 499-502.

New industrial and research equipment. Diagrams. 6 ref. (S general, ST)

14-S. X-Ray Techniques and High-Speed Recording. J. Savage and D. S. Box. *Metal Treatment and Drop Forging,* v. 21, Nov. 1954, p. 503-505.

Application of principles of general physics. Diagram, graph. 3 ref. (S general)

15-S. Ultrasonic Inspection by the Through-Transmission and Pulse-Reflection Methods. H. Krainer and E. Krainer. *Henry Brutcher, Altadena, Calif., Translation no. 3378,* (Abridged from *Archiv für das Eisenhüttenwesen,* v. 24, no. 5-6, 1953, p. 229-236.)

Previously abstracted from original. See item 311-S, 1953. (S13)

16-S. Quick and Precise Routine Determination of the Thickness of Steel Sheet from One Side. Friedrich Förster. *Henry Brutcher, Altadena, Calif., Translation no.* 3387, 12 p. (From Report No. 26, Institut Dr. Förster, Reutlingen (Germany), 1953, 15-page Typescript.)

Description and performance of instrument. Graphs, diagrams, photographs. 6 ref. (S14, ST)

17-S. Sampling Liquid Steel for Oxygen Content: A Further Evaluation of the Bomb Technique. S. Gilbert and G. R. Bailey. *Journal of Metals,* v. 6, Dec. 1954; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 200, Dec. 1954,p. 1383-1385.

Close agreement with earlier evaluation confirms validity of sampling method. Tables, graph. 2 ref. (S11, ST)

18-S. (Polish.) **Nondestructive Testing of the Thickness of Non-Magnetic Coatings.** A. Stryk. *Prace Instytutow Ministerstwa Hutnictwa,* v. 6, no. 5, 1954, p. 221-234.

Instrument suitable for flat or curved surfaces. Diagrams, graphs, tables, photographs. 8 ref. (S14, L general)

19-S. (Russian.) **Basic Problems of the Use of Radioactive Radiations in Measuring Techniques.** N. I. Shteinbok. *Uspekhi Fizichestkikh Nauk,* v. 54, no. 2, Oct. 1954, p. 231-284.

Equipment, techniques and theories. Tables, circuit diagrams, diagrams. 81 ref. (S19)

20-S. The Examination of Surface Topography by Interferometric Methods. W. D. Biggs. *Institute of Metals, Journal,* v. 83; *Institute of Metals, Bulletin,* v. 2, Dec. 1954, p. 179-181.

Techniques of interferometry; applications. 16 ref. (S15)

21-S. Materials Engineering File Facts. Government Specification Chart for Stainless Steel. *Materials & Methods,* v. 40, Dec. 1954, p. 131, 133.

Chemical compositions. (S22, SS)

22-S. Development of and Acceptance Testing Procedures Against Specifications. A. W. F. Green. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 266-271.

Need of cooperation and understanding between producer and consumer, principles of specification writing and design of tests to meet specification requirements. (S22)

23-S. (German.) **Eddy-Current Process of Nondestructive Testing of Metals.** F. Förster. *Aluminium,* v. 30, no. 12, Dec. 1954, p. 511-516.

Methods and equipment for determining properties, compositions, defects and thicknesses of metal, protective and insulating coatings. Diagrams, graphs, photographs, table. 29 ref. (S13, S14, S11)

24-S. (German.) **Limits of Observing Light-Metal Parts on the Luminescent Screen With X-Ray Illumination.** F. Ebert. *Aluminium,* v. 30, no. 12, Dec. 1954, p. 517-519.

Technical conditions for satisfactory X-ray inspection. Tables, graph, photographs. 2 ref. (S13)

25-S. (German.) **Nondestructive Materials Testing.** F. Rohner. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 11, Nov. 1954, p. 371-373.

Reviews progress in radiography, electric-induction, magnetic and ultrasonic processes since 1948. 18 ref. (S13, S14, S15)

26-S. A Simple Microscope Attachment for Observing High-Temperature Phenomena. J. H. Welch. *Journal of Scientific Instruments,* v. 31, Dec. 1954, p. 458-462.

Small, electrically heated thermocouple, in contact with thermojunction, permits study of reactions occurring during the formation of cements and blast furnace slags. Micrographs, diagrams, circuit diagrams. 1 ref. (S16, M23, B21)

27-S. The Application of Metal Powder Association Core Standards

and Data Sheets. Lester M. Becker. *Metal Powder Association, Proceedings,* v. 2, 1954, p. 91-98.

Review of progress in standardization of dimensions and properties of powdered iron cores by the Electronic Core Division. Photographs, table, diagrams. (S22, H11, Fe)

28-S. **Standard H-Steels, 1330-H to 3316-H.** *Metal Progress,* v. 67, Jan. 1955, p. 128B.

Data sheet giving hardenability limits for five series of alloy steels. (S22, J26)

29-S. **Radiographic Inspection of Petroleum Pipe Lines.** Harold Horland. *Pipe Line News,* v. 26, Dec. 1954, p. 39-43.

Merits of method; selection of proper radiographic sources; weld inspection and control; costs. Photographs, tables. 2 ref. (S13)

30-S. **Using the Interference Microscope for Thickness Measurements of Decorative Chromium Plating.** J. D. Thomas and Stanley R. Rouse. *Plating,* v. 42, Jan. 1955, p. 55-57.

To replace "spot test" because of acid attack on base metal. Photographs, micrographs, diagrams. 4 ref. (S14, L17, Cr)

31-S. (German.) **Tolerances and Errors in Measuring Temperature With Thermocouples. Pointers on the Practical Use of Thermocouples and Protective Tubes.** Kurt Guthmann. *Archiv für das Eisenhüttenwesen,* v. 25, nos. 11-12, Nov.-Dec. 1954, p. 535-561.

Definition of terms; uses, standards, tolerances and relative accuracy of thermocouples; indicating and recording instruments. Tables, graphs, diagrams, photographs. 78 ref. (S16)

32-S. (German.) **Research on the Effect of Structure on the Extinction of Ultrasound Waves in Metals.** Hugo Josef Seemann and Werner Bentz. *Zeitschrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 663-669.

Review of literature and experimental data on aluminum, iron, steel and copper to determine influence of grain size on loss of intensity of high-frequency elastic waves. Diagram, table, graphs, photographs. 8 ref. (S13, P10, Al, Fe, ST, Cu)

33-S. (German.) **Industrial Experiences With the Magnatest Q Instrument.** Hans Beuse and Herbert Koelzer. *Zeitschrift für Metallkunde,* v. 45, no. 12, Dec. 1954, p. 677-686.

Correlation between magnetic characteristics and composition of steels; sorting, hardness testing, and locating defects. Graphs, tables, photographs. 5 ref. (S13, S11, P16, Q29, ST)

34-S. (Book.) **The Composition and Assaying of Minerals.** John Stewart-Remington and Wilfrid Francis. 128 p. 1953. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. $5.50.

Guide for mineralogists, metallurgists, geologists, chemists, and students. (S11)

35-S. **Thulium 170 for Industrial Radiography.** R. Halmshaw. *British Journal of Applied Physics,* v. 6, Jan. 1955, p. 8-10.

Survey of properties and possible applications. Graphs, tables. 10 ref. (S13, S19, Tm, Al, ST)

36-S. **Effect of Cold Worked Surfaces Upon Ultrasonic Echoes in Single Crystal Specimens of Lead.** E. W. Kammer. *Review of Scientific Instruments,* v. 26, Jan. 1955, p. 14-15.

Cold worked surfaces distort the pulse and may lead to serious errors. Chart, diagram, table. (S13, P10, Pb)

37-S. **Electrical Parasites Hamper Temperature Measurement.** D. J. Pearse. *Steel Processing,* v. 41, Jan. 1955, p. 22-23, 52.

Sources of stray currents and methods of preventing their interference with thermocouple readings. Diagrams. (S16)

38-S. **Ultrasonic Testing of Welds.** J. D. Hislop. *Welding and Metal Fabrication,* v. 23, Jan. 1955, p. 7-13.

Possible application, limitations of method, inspection techniques. Diagrams, table, photographs. (S13)

39-S. **Recent Advances in Ultrasonic Nondestructive Testing.** J. Krautkrämer. *Henry Brutcher Translation no.* 3357, 11 p. Henry Brutcher, Altadena, Calif. (Slightly abridged from *Zeitschrift für Metallkunde,* v. 45, no. 4, 1954, p. 154-157.)

Previously abstracted from original. See item 263-S, 1954. (S13, ST)

40-S. **A Method of Quantitative Nondestructive Testing Employing a Slip-Over Coil. A-B.** F. Förster and K. Stambke. *Henry Brutcher Translation nos.* 3398-3399, 38 p. Henry Brutcher, Altadena, Calif. (Slightly condensed from *Zeitschrift für Metallkunde,* v. 45, no. 4, 1954, p. 166-179.)

Previously abstracted from original. See item 266-S, 1954. (S13, S14)

41-S. **Magneto-Inductive Crack Detection in Steel.** F. Förster. *Henry Brutcher Translation no.* 3401, 13 p. Henry Brutcher, Altadena, Calif. (Condensed from *Zeitschrift für Met-*

allkunde, v. 45, no. 4, 1954, p. 221-226.)

Previously abstracted from original. See item 266-S, 1954. (S13, S14)

42-S. **Magneto-Inductive Method of Nondestructive Testing, With Consideration of the Fundamental Frequency Only.** F. Förster. *Henry Brutcher Translation no.* 3406, 10 p. Henry Brutcher, Altadena, Calif. (Condensed from *Zeitschrift für Metallkunde,* v. 45, no. 4, 1954, p. 206-211.)

Previously abstracted from original. See item 270-S, 1954. (S10, P15, P16, ST)

43-S. (German.) **The Behavior of Metallic Heating Elements in Service-Life Testing.** A. Schulze and D. Bender. *Metall,* v. 9, nos. 1-2, Jan. 1955, p. 7-13.

Present status of short-time service-life testing of heating elements; equipment and methods; factors which affect test results. Photographs, table, graphs. 17 ref. (S21, Ni, Cr, Fe, Al)

44-S. (German.) **Nondestructive Testing of Metals With the Magneto-Inductive Scanning-Coil Instrument.** H. Breitfeld. *Metall,* v. 9, nos. 1-2, Jan. 1955, p. 14-22.

Determination of segregations, hardness, defects and thicknesses. Diagrams photograph, tables, graphs. 11 ref. (S13, S14)

45-S. (German.) **Ultrasonic Testing Device for Rails.** W. Kutzsche. *Nachrichtentechnik,* v. 4, no. 12, Dec. 1954, p. 544.

Russian device for indicating horizontal and oblique cracks. (S13)

46-S. (German.) **Temperature Control for Electric Heat-Treating Furnaces.** E. T. H. J. Horowitz. *Sprechsaal,* v. 88, no. 1, Jan. 1955, p. 2-5.

Design and operation of different temperature controls. Photographs, diagrams. (To be continued.) (S16, J general)

47-S. **Application of Statistical Analyses for Quality Control in Steel Mills.** Henry F. Myers. *American Iron and Steel Institute, Preprint,* 1954, 16 p.

Use of statistical principles for analyzing large collections of data. Graphs, table. 7 ref. (S12, D general)

48-S. **High Voltage Sources for Industrial Radiography—Past and Present, and Future Trends.** E. E. Charlton. *Nondestructive Testing,* v. 13, Jan.-Feb. 1955, p. 13-22.

Development of equipment, accessory devices. Photographs, diagrams, graph. 36 ref. (S13)

49-S. **Theory and Application of Coil Magnetization.** Glenn O. McClurg. *Nondestructive Testing,* v. 13, Jan.-Feb. 1955, p. 23-25.

Theoretical and experimental data on effective permeability of parts during magnetic particle inspection. Tables, graph. 8 ref. (S13)

50-S. **Nondestructive Testing in Shipbuilding and Ship Repairs.** A. K. Hutton. *Nondestructive Testing,* v. 13, Jan.-Feb. 1955, p. 27-31, 35.

Requirements, applications and usefulness of nondestructive testing methods. Photographs, radiographs. 1 ref. (S13)

51-S. **Magnetic Particle, Penetrant and Related Inspection Methods as Production Tools for Process Control.** Hamilton Migel. *Steel Processing,* v. 41, Feb. 1955, p. 86-91, 127.

Review of equipment, methods and uses. Photographs. (S13)

52-S. (French.) **Industrial Control by Ultrasonics. Materials and Ultrasonics. Method of Control by Transmission.** Jean Daurat. *Métallurgie et la construction mécanique,* v. 87, no. 1, Jan. 1955, p. 31, 33-34.

Theoretical basis, research into the hidden defects in the materials. Diagrams. (To be continued.) (S13)

53-S. (German.) **Accurate Temperature Measurements in Metal Melts.** Erwin Samal. *Giesserei,* v. 42, no. 2, Jan. 20, 1955, p. 36-37.

Advantages of immersion thermocouples over optical pyrometers. Design, circuit and operation of an accurate portable temperature-measuring instrument. Diagrams. 4 ref. (S16)

54-S. (German.) **The Use of Photo-Electricity in the Metal-Processing Industry.** H. D. Schulz-Methke. *Metall,* v. 9, nos. 3-4, Feb. 1955, p. 97-99.

Properties of different photo-electric cells used for quality and production control. Graph, photographs. 4 ref. (S18)

55-S. (German.) **Temperature Control of Electric Heat Treating Furnaces.** J. Horowitz. *Sprechsaal,* v. 88, no. 2, Jan. 1955, p. 23-26.

Operation principle for automatic controls; consideration of temperature of charge, furnace chamber, heating wires and recorded temperature; accuracy of control; thermal potentials of precious and base met-

al thermocouples. Graphs, diagram. 2 ref. (To be continued.)
(S16, J general)

56-S. Inspection Keeps Pace With Modern Manufacturing Methods. W. H. Vann. *Machinery,* v. 61, Mar. 1955, p. 162-169.

Development of automatic inspection equipment for use in manufacture of automobile engines. Photographs. (S general)

57-S. (Book.) **ASTM Standards on Copper and Copper Alloys.** ASTM Committee B-5. 586 p. Sept. 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. $3.75.
(S22, Cu)

58-S. (Book.) **The Handbook of Measurement and Control.** M. F. Behar, editor. 2nd Ed. 216 p. 1954. The Instruments Publishing Co., Inc., 845 Ridge Ave., Pittsburgh 12, Penna.

Designed to classify and outline operating principles and applications of laboratory, scientific, engineering, and industrial instruments. (S general)

59-S. Metals Engineering and Radioactive Materials. G. G. M. Carr-Harris. *Canadian National Research Council, Technical Information Service Report No.* 42, Dec. 1954, 37 p.

Uses of radioisotopes in nondestructive testing, study of dynamic processes and in various instruments. 175 ref. (S19)

60-S. Assessment of Quality of Wrought Products. W. G. Shilling. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 193-198.

Inspection procedures; sampling; nondestructive testing. (S general)

61-S. The Control of Quality in Heat-Treatment and Final Operations in the Production of Rolled, Extruded, and Drawn Aluminium and Aluminium Alloys. A. J. Field and J. Salter. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 199-220.

Factors that should be controlled to insure satisfactory quality in the finished product. Operations covered include sheet shearing from coil, flattening, finish shearing, slitting, blanking, straightening of sections, drawing and finishing of tubes, inspection and packing. Tables, diagram. 10 ref.
(S general, F general, J general, Al)

62-S. The Control of Quality in the Heat-Treatment and Finishing of Copper and Copper-Base Alloys. V. B. Hysel and T. W. Collier. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 233-246 + 1 plate.

Inspection and controls for heat treating, shearing, straightening, cutting to length and removal of burrs. Tables, micrographs, photographs. 6 ref.
(S general, J general, F general, Cu)

63-S. Mechanical Failures of Metals in Service. John A. Bennett and G. Willard Quick. *U. S. National Bureau of Standards Circular* 550, Sept. 1954, 36 p.

Thirty-five representative types of failure. Factors of design, fabrication or use contributing to these failures. Photographs, tables, graph, micrographs. 6 ref. (S21, Q general)

64-S. Ultrasonic Methods for Studying the Properties of Hardened Steel and for Detecting Internal Defects in Steel Parts. S. Ya. Sokolov. *Henry Brutcher Translation No.* 3392, 19 p. (From *Zhurnal Tekhnicheskoi Fiziki,* v. 11, nos. 1-2, 1941, p. 160-169.) Henry Brutcher, Altadena, Calif.

Fundamentals of ultrasonic testing; measurement of case depth and detection of inclusions. Diagrams, micrographs, photographs.
(S13, ST)

65-S. (Dutch.) **Detection of Hair-Line Cracks in Metals.** *Bedrijf en Techniek,* v. 10, no. 220, Jan. 29, 1955, p. 57-58, 65.

The magnaflux, "Met-L-Chek," and ultraviolet-light methods for detecting cracks in ferrous and nonferrous metals. (S13)

66-S. (French.) **Gamma Radiography: A Nondestructive Testing Technique for Industrial Applications.** F. C. Fontenay. *Métaux, Corrosion-Industries,* v. 30, no. 353, Jan. 1955, p. 9-17.

Characteristics of radiations from various radioisotopes; equipment and techniques. Photographs, table, gammagraph. (S19)

67-S. (German.) **The Importance of Radioactive Radiation to Materials Science.** P. Müller. *VDI Zeitschrift,* v. 97, no. 5, Feb. 11, 1955, p. 138-144.

Effect of various types of radiation on properties of metals, plastics, ionic crystals, glasses and liquids; use of radioactive rays and radioactive tracers in testing materials. Photographs, graphs, table. 18 ref. (S19, P10)

68-S. Methods of Bond Testing. W. J. McGonnagle, J. H. Monaweck and W. G. Marburger. *Nondestructive Testing,* v. 13, Mar.-Apr. 1955, p. 17-22.

The ultrasonic transmission method was most sensitive, the electrode potential and thermographic methods less sensitive. Diagrams, graphs,

tables, photographs, micrographs. 3 ref. (S general, L24)

69-S. Industrial X-Ray Fluoroscopic Apparatus Design. Charles A. Mitchell and Warren W. Inglis, Jr. *Nondestructive Testing,* v. 13, Mar.-Apr. 1955, p. 23-27.

Two types of industrial fluoroscopes in which effort has been made to incorporate recent innovations for examination of critical ordnance components. Diagrams, photographs, tables. (S13)

70-S. Safe and Economical Use of Isotopes in the Steel Industry. C. A. Karrer. *Nondestructive Testing,* v. 13, Mar.-Apr. 1955, p. 29-31.

Operation and physical layout of gamma-ray testing equipment. Photographs. (S13, S19)

71-S. (Japanese.) **Statistical Investigation of Broken Springs.** Katsunobu Tomita, Susumu Kikuchi and Takeshi Hirai. *Journal of Railway Engineering Research (Japan),* v. 12, no. 1, Jan. 10, 1955, p. 6-9.

Analysis of causes of service failures of leaf springs on Japanese freight cars. Graphs, tables. (S21, SG-b)

72-S. (Pamphlet.) **Symposium on Radioactivity—an Introduction.** ASTM Special Technical Publication No. 159. 46 p. 1954. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

Six papers on measurement uses and handling techniques for radioisotopes. (S19)

73-S. Acceptance Sampling of Electroplated Articles. J. M. Cameron and Fielding Ogburn. *American Electroplaters' Society, Proceedings,* v. 41, 1954, p. 19-22.

Basic ideas behind acceptance sampling. Graphs. 3 ref. (S12, L17)

74-S. Air Gaging Proves Economical for Short Run Parts. C. K. Swafford. *Iron Age,* v. 175, Apr. 7, 1955, p. 129-131.

Air gages on grinders, boring mills and superfinishing equipment are used to gage part tolerances of 0.0007 in. and less. Photographs. (S14)

75-S. Magnetic and Electromagnetic Sorting of Semifinished Steel and of Mass-Produced Parts. F. Förster. *Henry Brutcher Translation No.* 3467, 20 p. (Condensed from *Archiv für das Eisenhüttenwesen,* v. 25, nos. 7-8, 1954, p. 383-392.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 366-S, 1954. (S10, ST)

76-S. How to Sort Plain Carbon Steels by Spark Testing. W. Jäniche and K. H. Saul. *Henry Brutcher Translation No.* 3472, 5 p. (Condensed from *Stahl und Eisen,* v. 68, nos. 17-18, 1948, p. 301-303.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 10B-25, 1949. (S10)

77-S. Isotopes and Metals Engineering. I. G. G. M. Carr-Harris. *Canadian Metals,* v. 18, Apr. 1955, p. 26-28, 30, 32.

Uses of radio-isotopes in the design and production of metal products. Photographs. (To be continued.) (S19)

78-S. (Czech.) **Photometric Determination of Aluminum in Steel.** K. Wacykiewicz. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, no. 1, 1955, p. 35-42.

Amounts of aluminum in steel determined by use of aluminon and eriochromecyanine. Graphs, tables. 32 ref. (S11, Al, ST)

79-S. (Czech.) **The Magnetic Powder "Aero" for Electromagnetic Determination of Steel Surface Defects.** Julius Subert and Jaroslav Jares. *Slévarenstvi,* v. 3, no. 3, Mar. 1955, p. 75-77.

Possibilities of the steel surface defectoscopy method by means of detection fluid and magnetic powder. Photographs. (S15)

80-S. (French.) **Industrial Control by Ultrasonics.** Jean Daurat. *Métallurgie et la construction mécanique,* v. 87, no. 3, Mar. 1955, p. 191-193, 195.

Describes reflectogage, an apparatus for ultrasonic control of materials by resonance; application to brazed joints. Diagram, reflectograms. (To be continued.) (S14)

81-S. (French.) **Signaling, Counting or Registration of the Defects of the Metallurgical Products, by Means of Ultrasonic Sounding With Echo.** L. Beaujard, V. Husarek and A. Vasset. *Revue de métallurgie,* v. 52, no. 3, Mar. 1955, p. 240-248.

Possibilities of mapping or counting defects in a given piece. Oscillograms, photographs, diagrams, micrographs. 4 ref. (S13)

82-S. A Re-Evaluation of Surface Finish. L. Chaney and C. H. Good. *American Society of Mechanical Engineers, Paper No.* 54—A-192, 1955, 9 p.

Correlation of surface finish with performance characteristics of machined parts. Effect of size of roughness width cut-off on finish standards. Tables, graphs, diagram. (S15)

83-S. Magnetic Particle Technique Makes Billet Inspection Positive and Efficient. O. G. Smith. *Iron Age,* v. 175, May 5, 1955, p. 99-101.

Benefits of billet inspection, using magnetized particles and ultraviolet light to detect flaws. Photographs. (S13, ST)

84-S. Metallurgical Inspection of Jet-Engine Parts. *Machinery,* v. 61, May 1955, p. 154-158.

Inspection practices to assure structural soundness of precision parts for jet engines and electronic guidance systems. Photographs. (S13)

85-S. Aluminium Casting Alloys. *Metallurgia,* v. 51, no. 306, Apr. 1955, p. 171-174.

Particular reference to alloys of B.S. 1490:1949 and to the aluminum-zinc-magnesium alloys. Tables. (S22, Al)

86-S. Automatic Temperature Control of Oil and Gas-Fired Furnaces. Leo Walter. *Metal Treatment and Drop Forging,* v. 22, Apr. 1955, p. 150-152.

Available methods: their selection and requirements. Circuit diagram, graphs. (S16, J general)

87-S. Practical Methods of Steel Identification. Howard E. Boyer. *Modern Machine Shop,* v. 27, May 1955, p. 140 + 9 pages.

Applicable where highly diversified manufacturing operations are performed and where problems revolving around mixed steels tend to become sizable. Diagram, photograph. (To be continued.) (S10)

88-S. Short Cut in Billet Conditioning. *Steel,* v. 136, May 2, 1955, p. 114, 117.

Method of speeding up inspection of semifinished steel for the tube mill. Photographs. (S general, ST)

89-S. Uses of Ultrasound in Technology and Physics. S. Ya. Sokolov. *Henry Brutcher Translation No.* 3029, 14 p. (From *Zavodskaya Laboratoriya,* v. 14, no. 11, 1949, p. 1328-1335.)

Technical applications of ultrasonic waves; development and use of an ultrasonic microscope. Graphs, diagram, circuit diagrams, micrographs, photograph. 8 ref. (S13, M23)

90-S. (French.) **Gammagraphic Examination of Light-Alloy Cast Pieces by Means of the Radio Isotope, Thulium 170.** Albert Blondel and Pierre Broquet. *Fonderie,* 1955, no. 110, Mar., p. 4427-4433.

Methods of use; quality study of radiographic images; examination of a copper-aluminum alloy. Diagrams, gammagraphs. 13 ref. (S13, Cu, CI)

91-S. (Pamphlet.) **Correlation List of American and European Composition of Stainless Steel.** Report no. PB 111549. 12 p. 1954. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.50.

Provides the American Iron and Steel Institute specifications for 33 types, and a comparison is made with principal European steels. (S22, SS)

92-S. Improving Casting Quality Through Non-Destructive Testing. Francis H. Hohn. *American Foundryman,* v. 27, May 1955, p. 96-100.

Equipment used to obtain quantitative information about steel casting quality which is then used to evaluate factors that might be responsible for deviations from the desired soundness level. Photographs, X-rays, radiograph, graphs, diagrams. (S13, CI)

93-S. Ultrasonics Makes Itself Heard. Peter K. Bloch. *Steel,* v. 136, May 16, 1955, p. 118-119.

Used as a thickness tester and to distinguish nodular from gray iron. Photographs. (S14, Fe)

94-S. Ultrasonic Inspection of Arc-Cast Zirconium and Its Alloys. F. W. Wood and J. O. Borg. *U. S. Bureau of Mines, Report of Investigations* 5126, Mar. 1955, 8 p.

The method may be used to delineate irregularities, inclusions, porosity or shrink holes in ingots up to 48 in. in length. Diagrams, photographs. (S13, Zr)

95-S. (German.) **Nondestructive Testing With the Aid of Electric Induction Processes.** W. Schirp. *Elektro-Post,* v. 8, nos. 8-9, Mar. 29, 1955, p. 234-237.

Principle of and equipment for detecting defects and sorting metals. Diagrams, photographs, micrographs, table. 11 ref. (S13, S10)

96-S. Gamma-Radiography in Oil Storage Installations. IV. C. C. Bates. *Atomics (British),* v. 6, May 1955, p. 144-147, 150.

Health and safety precautions applicable in this type of work. New method of nondestructive testing enables very high standard of weld inspection to be achieved. Photographs. (S13)

97-S. Gaging of Plating Thickness Points to Automatic Inspection. *Automation,* v. 2, June 1955, p. 57-60.

Three new gages point to automatic inspection and process control

applications. Photographs, diagrams. (S14, L17)

98-S. Quality Control—Use of Statistical Methods in Steel Industry. A. V. Sukhatme. *Indian Institute of Metals, Transactions,* v. 7, 1953, p. 123-133; disc., p. 133-136.

Some examples of the application of quality control which show that substantial results were achieved. Diagrams, graphs. (S12, D general, ST)

99-S. Industrial Applications of X-Ray Techniques. T. H. Rogers. *Institute of Radio Engineers, Transactions on Industrial Electronics,* PGIE-2, Mar. 1955, p. 20-26.

Used for industrial and flash radiography, fluoroscopy and thickness gaging. Diagrams, circuit diagrams, photographs. 6 ref. (S13, S14)

100-S. Carbon in Steel. A. P. H. Jennings. *Iron & Steel,* v. 28, May 1955, p. 208-210.

A review of physical methods of determination. 12 ref. (S11, ST)

101-S. Radiographing 620 Miles of Welded Pipeline. *Welding Journal,* v. 34, May 1955, p. 459-460.

Equipment, methods and problems in construction of 8-in. line in Alaska. Photographs. (S13, K general, CN)

102-S. (German.) **New Possibilities in the Radiography of Steel.** G. Lang. *VDI Zeitschrift,* v. 97, nos. 11-12, Apr. 15, 1955, p. 347-350.

Steel of considerable thickness can be inspected directly by using an image-amplifying tube instead of a fluorescent screen. Graphs, diagrams, photographs, table. 7 ref. (S13, ST)

103-S. (German.) **Measuring Small Radiating Powers With Thermocouples.** Fritz Hoffmann and Ulrich Schley. *Zeitschrift für angewandte Physik,* v. 7, no. 3, Mar. 1955, p. 109-113.

Optical and electrical arrangements for measuring radiation in terms of microvolts. Diagrams, tables, graphs. 5 ref. (S19, S16)

104-S. (Russian.) **Use of Radioactive Isotopes to Control the Homogeneity of Solid Bodies and Determine Linear Dimensions.** M. B. Neiman. *Stanki i Instrument,* v. 26, no. 4, Apr. 1955, p. 1-5.

Application of xeroradiography; determination of corrosion, wall and coating thicknesses. Diagrams, graphs. 21 ref. (S19, S13, S14)

105-S. Isotopes and Metals Engineering. II. G. G. M. Carr-Harris. *Canadian Metals,* v. 18, May 1955, p. 22-26.

Use of radio-active tracers and radiography in design and production of metal products. Photographs. (S19)

106-S. Comparator for Gas-Turbine Blade Roots. L. W. Nickols. *Engineering,* v. 179, May 20, 1955, p. 625-627.

Principles of operation, features of the comparator, sensitive adjustment of strut length, rotating turret, setting and operating, measuring pitch of serration centers. Diagrams, photographs. (S14)

107-S. An Infra-Red Radiation Pyrometer. J. D. Harmer and B. N. Watts. *Journal of Scientific Instruments,* v. 32, May 1955, p. 167-170.

Principles, description, calibration, emissivity correction. Graph, photograph, diagrams. 7 ref. (S16)

108-S. (English.) **Industrial Applications of Radioactivity.** Torbjörn Westermark, Gunnar Aniansson, Lars-Gustaf Erwall and Knut Ljunggren. *IVA Tidskrift för Teknisk-Vetenskaplig Forskning,* v. 26, no. 3, 1955, p. 81-85.

Uses in flotation chemistry, thickness measurements with gamma rays, wear studies, other applications. Photograph. 13 ref. (S19, S14, Q9, B14)

109-S. (French.) **New Application of Ultra-Sound in the Testing of Materials.** J. Brigg. *Revue universelle des mines,* v. 11, ser. 9, Apr. 1955, p. 137-151.

Review of existing methods of nondestructive testing. Fields of application of ultrasonic methods. Photographs, tables, diagrams. 17 ref. (S13)

110-S. (German.) **The Significance of Flow Phenomena in the Iron and Steel Industry.** Michael Hansen. *Stahl und Eisen,* v. 75, no. 7, Apr. 7, 1955, p. 401-410.

Survey of fluid flow of fuels, air and other fluids in ducts, compressors and pumps. Diagrams, graphs, photographs, micrographs, table. 19 ref. (S18, D general, Fe, ST)

111-S. Direct Reading Spectrometer Speeds Magnesium Production. C. A. Sauer. *Iron Age,* v. 175, June 16, 1955, p. 87-89.

Through the development of direct reading instruments for spectrochemical analysis, tighter control of alloy content in a fraction of the time previously required is possible. Diagrams, graph, photograph, table. (S11, Mg)

112-S. Electron Microscopy Can Aid Machining Research. *Metalworking Production,* v. 99, Apr. 22, 1955, p. 714-715.

Surface roughness indications by

an electron beam almost parallel to the material surface. Micrographs. (S15)

113-S. The Preparation and Handling of Intense Radioactive Sources. P. J. Stewart. *Nondestructive Testing,* v. 13, May-June 1955, p. 11-13, 33.

Importance of neutron fluxes and reactor size in the production of radioactive materials. Handling of gamma ray sources for industrial radiography. Photographs. (S19)

114-S. Radiography of Small Castings With High Cobalt or Nickel Content. E. Alfred Burrill. *Nondestructive Testing,* v. 13, May-June 1955, p. 19-21.

Radiographic problems introduced by these castings and development of an economical technique using a 1-million-v. Van de Graaff X-ray generator as the source of penetrating radiation. Photograph, diagram. (S13, Co, Ni)

115-S. Industrial Xeroradiography in 1955. Robert G. Vyverberg, Harold E. Clark and John H. Dessauer. *Nondestructive Testing,* v. 13, May-June 1955, p. 35-40.

Process based on a photoconductive layer which is electrostatically sensitized, exposed to X-rays, and then developed by passing over it an oppositely charged powder to form a visible image. Photographs, diagrams. 9 ref. (S13)

116-S. Non-Destructive Testing. *Railway Locomotives and Cars,* v. 129, June 1955, p. 57-60.

Testing of railroad parts and equipment used to promote safety, improve inspection, give quality control of materials and reduce over-all costs. Photographs. (S general)

117-S. (German.) **Comparison Tests on the Accuracy of the Supersonic Test of Large Forgings.** Werner Türk, Walter Knorr and Klaus Barteld. *Stahl und Eisen,* v. 75, no. 10, May 19, 1955, p. 629-633.

Comparison of supersonic and destructive testing by nine separate groups of testers. Diagrams, photographs. 7 ref. (S13, ST)

118-S. (Hungarian.) **Inspection of Metallurgical Products by Ultrasonics.** Pal Réti. *Kohaszati Lapok,* v. 10, no. 5, May 1955, p. 215-222.

Hungarian experience on ingots, steel rods, large forged pieces, thick-walled tubes and plates. Diagrams, photographs. (S13, ST)

119-S. Report of Committee A-1 on Steel. *American Society for Testing Materials, Preprint No.* 1, 1955, 45 p.

Tentative recommended practices for ultrasonic testing and inspection of heavy steel forgings. Proposed specificaitons for chromium-molybdenum steel plates for boilers and other pressure vessels; alloy steel castings normalized and drawn for high pressure and elevated temperature service, and alloy steel chain. Tables. (S13, S22, CN, AY, SS-h)

120-S. Report of Committee A-3 on Cast Iron. *American Society for Testing Materials, Preprint No.* 3, 1955, 13 p.

Tentative specifications for compositions of various grades of foundry pig iron and methods of testing chilled and white iron castings. Table, diagram. (S22, CI)

121-S. Report of Committee A-6 on Magnetic Properties. *American Society for Testing Materials, Preprint No.* 5, 1955, 21 p.

Proposed revised standard methods for testing magnetic materials, normal induction and hysteresis of magnetic materials, and specifications for flat-rolled electrical steel. Tables. (S22, P16, SG-p)

122-S. Report of Committee B-12 on Non-Ferrous Metals and Alloys. *American Society for Testing Materials, Preprint No.* 9, 1955, 10 p.

Proposed tentative specifications for titanium sponge and fire-refined casting copper. Tables. 3 ref. (S22, Cu, Ti)

123-S. Report of Committee B-5 on Copper and Copper Alloys, Cast and Wrought. *American Society for Testing Materials, Preprint No.* 12, 1955, 31 p.

Proposed tentative specifications for tellurium-copper rod, threadless copper pipe, copper and copper-alloy forging rod, bar and shapes and seamless copper bus pipe and tubes. Tables. (S22, Te, Cu)

124-S. Report of Committee B-7 on Light Metals and Alloys, Cast and Wrought. *American Society for Testing Materials, Preprint No.* 14, 1955, 39 p.

Miscellaneous recommendations affecting standards for light metals and alloys. Tentative specifications for aluminum bars for electrical purposes (bus bars). Tables. (S22, Al)

125-S. Report of Committee B-9 on Metal Powders and Metal Powder Products. *American Society for Testing Materials, Preprint No.* 16, 1955, 12 p.

Tentative specifications for copper-infiltrated iron parts and for metal powder sintered bearings (oil

impregnated) of bronze and iron-base mixtures. Tables.
(S22, H16, Cu, Fe)

126-S. Report of Committee E-7 on Non-Destructive Testing. *American Society for Testing Materials, Preprint No.* 63, 1955, 23 p.

Proposed tentative method for dry powder magnetic particle inspection. Photographs. (S13)

127-S. Thermocouple Immersion Errors. J. M. Berry and D. L. Martin. *American Society for Testing Materials, Preprint No.* 95, 1955, 8 p.

An attempt is made to distinguish between two types of "immersion" errors. First type occurs when an inhomogeneous portion of a thermocouple (developed, perhaps, at the service temperature) is subjected to a temperature gradient, and the second is related to conduction of heat to or from the hot junction of the thermocouple. Graphs, diagrams, table. 5 ref. (S16)

128-S. New Testing Methods Increase Foundry Efficiency. W. J. Stewart. *Canadian Metals,* v. 18, June 1955, p. 40-42.

Use of X-ray and gamma-ray radiography, magnetic particle, liquid penetrant and ultrasonic waves in nondestructive testing. Diagrams, photographs. (S13)

129-S. British Standards for Aluminium. E. Elliott. *Engineers' Digest,* v. 16, May 1955, p. 221-226.

Standards for aluminum and its alloys for general engineering purposes and for the specialized field of aircraft construction. Tables. 1 ref. (S22, Al)

130-S. Calibration of Temperature Measuring Instruments. *Great Britain National Physical Laboratory, Notes on Applied Science,* no. 12, 1955, 47 p. + 2 plates.

Methods and apparatus used for making routine checks and maintaining working standards. Photographs, graphs, diagrams, tables. (S16)

131-S. Testing and Inspection—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2K-12K.

Review of nondestructive test methods and instrumentation gaging and developments and future prospects. Photographs. (S13, S14)

132-S. Method of Measuring Film Thickness of Solid Lubricants. H. M. McCullough and I. Sheinhartz. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, July 1955, p. 822-823.

Superficial Rockwell hardness tester can be used as a device for measuring thickness of sprayed graphite and similar coatings at normal and slightly elevated temperatures. Maximum measurable thickness depends on load and diameter of penetrator. Graph. (S14)

133-S. Simple Tests for Identifying Metals by Appearance, Chip Test, and Blowpipe Test. *Linde Tips,* v. 34, July 1955, p. 58-59.

Identification by using appearance of fracture surface, unfinished surface, newly machined surface, chip size, facility of chipping, speed of melting, color change while heating, slag and action of slag given in table form. Table. (S10)

134-S. Where and How Spectrography Can Help You. Howard E. Boyer and Frank E. Fitzgerald. *Materials & Methods,* v. 41, June 1955, p. 95-99.

Flexible and useful tool that has proved its worth in many metal fabricating plants for rapidly identifying and sorting alloys and for determining their composition. Spectrograms, diagram, graphs.
(S11, S10)

135-S. Testing the Thickness and Adhesion of Electroplated Coatings. *Mechanical World and Engineering Record,* v. 135, June 1955, p. 256-261.

Coating thickness and quality tested by the B.N.F. jet-test; describes test and apparatus. Diagrams, tables, graphs. 10 ref.
(S14, L17)

136-S. Non-Contact Hardness Tester Sorts Castings Magnetically. Milton J. Diamond. *Metalworking Production,* v. 99, June 17, 1955, p. 1091-1092.

Automatic magnetic comparator measures hardness of steel rocker arms for automobile engines at 3000 pc. per hr. Photograph, diagrams.
(S10, Q29, CI)

137-S. Study of Some Properties of Stresscoat. A. J. Durelli, S. Okubo and R. H. Jacobson. *Society for Experimental Stress Analysis, Proceedings,* v. 12, no. 2, 1955, p. 55-76.

Variables influencing the coating behavior and characteristics used to evaluate the coating. Graphs, table. 1 ref. (S13, Q25)

138-S. Weld Quality—"Score-Card" Aids Industrial Control. E. C. Osborne. *Steel Processing,* v. 41, June 1955, p. 363-366.

Charts and control procedures for industrial welding operations. Graphs. (S12, K general)

139-S. Cases of Damage to Steam Turbines and How to Prevent Such Damage. E. Pohl. *Henry Brutcher Translation No.* 3512, 7 p. (Abridged from *Stahl und Eisen,* v. 71, no. 25, 1951, p. 1375-1379.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 72-S, 1952.
(S21, Q7, ST)

140-S. Spectroanalysis of Phosphorus in Steel. E. S. Kudelya and A. S. Dem'yanchuk. *Henry Brutcher Translation No.* 3520, 4 p. (From *Doklady Akademii Nauk SSSR,* v. 83, no. 3, 1952, p. 397-398.) Henry Brutcher, Altadena, Calif.

Previously abstracted from original. See item 357-S, 1952.
(S11, CI, ST)

141-S. (Dutch.) **Reliable Measuring Equipment in Heavy Industry.** R. Smit. *Bedrijf en Techniek,* v. 10, no. 227; *Electronica section,* v. 8, no. 174, May 7, 1955, p. 73, 75, 77.

Use of electronic equipment for measuring temperatures, pressure, thickness, etc. in the heavy metals industry. Photographs, diagrams. 11 ref. (S general)

142-S. (German.) **Materials Testing in Electroplating.** J. Elze. *Metall,* v. 9, nos. 11-12, June 1955, p. 458-465.

Methods of testing metal platings and anodic oxide coatings for thickness, surface condition, porosity, hardness, internal stresses, impurities and electrical properties. Photograph, graphs, diagrams. 11 ref. (S13, S14, S15, L17, L19, P15)

143-S. (German.) **Development of Nondestructive Testing and the Problems of Its Application.** M. Pfender and O. Vaupel. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 24-33.

Nondestructive testing methods; recent developments in preferred methods of testing weld joints; factors to be considered in the use of nondestructive testing methods and in evaluation of test results. Tables, diagrams, photographs, graphs.
(S13, K general)

144-S. (German.) **Nondestructive Testing of Materials and Its Limitations.** P. Gayer. *Schweissen und Schneiden,* v. 6, special no., 1954, p. 33-37.

Detection of shallow and deep surface cracks, precipitations and defects in austenitic steels and welds; determination of mutual adhesion of two different materials; comparison of ultrasonic and X-ray tests; preference of using radioactive isotopes over X-rays for testing welded pipelines. Table, photographs. (S13)

145-S. (Polish.) **Use of Radioactive Isotopes in Investigating Nonmetallic Inclusions in Steel for Roller Bearings.** Leonid Andrejew. *Wiadomosci Hutnicze,* v. 11, no. 3, Mar. 1955, p. 82-84.

Slag impurities in steel melted in high-frequency induction furnace. Contamination by particles from the basic lining of the crucible of the induction furnace, by slag particles of the bearing steel melted in a ½-ton arc furnace, and by impurities from the pouring set-up. Tables. (S19, D6, D9, ST)

146-S. (Book.) **1955 SAE Handbook.** 1094 p. Society of Automotive Engineers, 29 West 39 St., New York 18, N. Y.

Standards and recommended practices on steels and iron; nonferrous metals; nonmetallic materials; threads; bolts, nuts, and screws; splines and serrations; bearings; springs; tubing and fittings; electrical equipment; lighting equipment; engines and parts; car, truck, bus equipment; tractors and earthmovers; and marine equipment.
(S22)

147-S. (Book—German.) **Ultrasonics and Its Uses in Science and Technology.** Ludwig Bergmann. 1114 p. 1954. S. Hirzel Verlag Stuttgart, Germany. $18.00.

Comprehensive treatise covers the methods of generating, detecting, and measuring ultrasonic frequencies; measurements of sound velocities and absorption in liquids and gases; determination of elastic and elastic-optical constants; and its applications in physics, chemistry, metallurgy, electrochemistry, telecommunications, biology, medicine, architecture, and nondestructive testing. (S general, P10)

148-S. Improved Radiographs by Means of Tungstate Intensifying Screens. F. Goos and T. Maas. *Engineers' Digest,* v. 16, June 1955, p. 271-272, 298. (From *Schweissen und Schneiden,* v. 6, no. 11, Nov. 1954, p. 447-450.)

Results of tests limited to investigations of steel thicknesses not exceeding 40 mm. and voltages up to 150 kv. Graphs. (S13, ST)

149-S. How to Design Effective Experiments. Frank Proschan and Alfred B. Babcock, Jr. *Chemical Engineering,* v. 62, Aug. 1955, p. 191-198.

Statistical approaches, which can cut down on the number of runs needed, increase accuracy and save time in planning, conducting and interpreting complex experimental work in laboratory, plant or office. Tables. 5 ref. (S12)

150-S. Who Should Be Responsible for Quality Control? Kenneth M. Smith. *Foundry,* v. 83, July 1955, p. 125-127.

Suggestions on where responsibility for an effective quality control program should be placed in foundries of various size. Photograph. (S12, E general)

151-S. Quality Control Instrumentation. C. M. Gilmour. *Metal Industry,* v. 86, June 24, 1955, p. 529-532.

Use of radioactive isotopes and ultrasonics in measuring thickness and flaw detection. Table, diagrams, photographs. (S13, S14)

152-S. Temperature Measuring Instruments. Henry Barry. *Metal Industry,* v. 86, June 24, 1955, p. 537-539.

System used by Morgan Crucible Co., Ltd. in handling systematic maintenance, repair and inspection of their temperature measuring equipment. Photographs. (S16)

153-S. Tentative Standard H-Steels. *Metal Progress,* v. 68, July 1955, p. 104-B.

Translates into a simplified chart form the hardenability curves and data issued by the American Iron and Steel Institute. Graphs. (S22, J26, ST)

154-S. Pyrometry—Some Suggestions for Maintenance. Leo Walter. *Steel Processing,* v. 41, July 1955, p. 435-438.

High-temperature optical, radiation millivolt pyrometers, care of thermocouple instruments, maintenance and correct installation. Diagrams, photographs. (S16)

155-S. Work on Engineering Dimensional Metrology at The National Physical Laboratory. F. H. Rolt. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 1-17.

Research and testing of optical comparators, screw gages and flatness and straightness measurement. Diagrams, photographs. (S14)

156-S. Work on Engineering Dimensional Metrology at The Mechanical Engineering Research Laboratory. D. G. Sopwith. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 19-28.

Gaging methods in wear testing. Photographs, diagrams, map. (S14, Q9)

157-S. The Wear on Fixed Gauges and Means to Lessen or Eliminate Its Influence. Hilding Törnebohm. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 29-33; disc., p. 55-59.

Cost factors of wear tolerances of gages for grinding operations. Graph. 2 ref. (S14, Q9, G18)

158-S. Measurement in the Field of Interchangeable Manufacture by Gauges or Indicating Appliances. G. Berndt. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 35-55; disc., p. 55-59.

Validity of use of go and no-go gages; indicating instruments for shafts. Diagrams, photographs. 8 ref. (S14)

159-S. Inspection of Prismatic Bodies by Means of an Optical Section and Application of This Method to Turbine Blades. Jacques Turrettini. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 61-71.

Use of optical profile projectors. Diagrams, photographs. 1 ref. (S14)

160-S. A New Precision Internal Measuring Machine. C. O. Taylerson and A. Turner. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 73-79; disc., p. 79-80.

Instrument capable of measuring the diameters of cylindrical reference ring gages to an accuracy of ± 0.00001 in. Photographs, diagrams. (S14)

161-S. Methods and Instruments for Thread Gauge Inspection. C. A. LeBourhis. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 81-95; disc., p. 108-109.

Comparison of efficiencies of various measuring machines. Photographs, diagrams. 1 ref. (S14)

162-S. Methods and Equipment of the Physikalisch-Technische Bundesanstalt for the Inspection of Thread Taper Gauges. K. Bürger and M. Gary. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 97-107; disc., p. 108-109.

Comparison of various gages; gage inspection procedures. Diagrams, photographs. 14 ref. (S14)

163-S. Organization and Use of Statistical Quality Control. M. Vercoutere. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 111-137; disc., p. 138-140.

Inspection procedures of a French plant manufacturing agricultural machinery and tractors. Graphs, diagrams, tables. 1 ref. (S12)

164-S. Statistical Techniques as Aids to Production Efficiency (The Role of Routine Inspection). B. P. Dudding. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 141-160; disc., p. 161-163.

Analysis of various inspection schemes in use in British plants. Graphs, photographs. 6 ref. (S12)

165-S. The Possibilities of Measuring Devices for Reducing Dispersion Factors. R. Yribarren. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 165-177; disc., p. 178.

Analysis of machine tool errors and gaging systems to counteract them. Diagrams. (S14, G17)

166-S. High-Speed Inspection of Turbine and Compressor Blades. J. Loxham. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 179-190; disc., p. 190-191.

Description and operation of semi-automatic equipment. Diagrams, photographs, tables. 1 ref. (S14)

167-S. Some Applications of Electronics to Industrial Dimensional Metrology. M. J. A. Chalvet. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 193-202; disc., p. 203-204.

Principles and operation of comparators. Diagrams. (S14)

168-S. A Review of Pneumatic Dimensional Gauges. Louis Polk. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 205-223; disc., p. 280-287.

Theory and operation of equipment for measuring dimensions in terms of the variations of pressure or flow in a pneumatic circuit. Diagrams, photographs. 26 ref. (S14)

169-S. The Pneumatic Method Applied to Dynamic Measurements. R. Yribarren. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 225-240; disc., p. 280-287.

Response characteristics and applications of pneumatic gages; examples of equipment for dynamic measurements. Diagrams, graphs, photographs, table. (S14)

170-S. A Pneumatic Gauging Method for Proving Rings. Kurt Hild. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 241-245; disc., p. 280-287.

Equipment and methods for measuring elastic deformation as a measure of effective force. Diagrams, photographs, graphs. (S14, Q21)

171-S. The Application of Pneumatic Gauging to Inspection Problems. F. R. Boosey. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 247-256; disc., p. 280-287.

Gaging principles and equipment; electric circuits; comparative efficiencies of pneumatic and other gages. Diagrams. (S14)

172-S. Pneumatic Gauging Instruments Developed at the National Physical Laboratory During Recent Years. J. C. Evans and I. G. Morgan. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 257-279; disc., p. 280-287.

Theory of size measurement, instruments for gaging yarns, wire and internal diameter. Graph, diagrams, photographs. 4 ref. (S14)

173-S. Machine Tool Metrology. D. F. Galloway. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 289-297; disc., p. 298-301.

Equipment and methods for checking machine tool alignments and fundamental movements. Photographs, diagrams, graph. (S14, G17)

174-S. Testing the Accuracy of Jig Boring Machines. T. R. Oakley. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 303-319; disc., p. 319-321.

Measuring equipment; alignment and flatness testing. Graphs, diagrams, photographs. (S14, G17)

175-S. Method of Recording the Pitch Errors of Screw-Cutting Lathes. F. H. Rolt. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 323-327; disc., p. 327-328.

Equipment by which lathes can be tested in the works and an autographic record obtained showing the complete periodic and progressive

errors over any length of traverse required. Diagrams, graph. (S14, G17)

176-S. Apparatus for Demonstrating Errors in Movements of Machine Tool Slides. F. H. Rolt and W. F. Atkins. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. I, p. 347; disc., p. 347-348.

Equipment and methods for measuring straightness and flatness. Diagram. (S14, G17)

177-S. Recent Developments in Gear Metrology. C. Timms. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 349-358; disc., p. 404-413.

Equipment and methods for measuring tooth profile, spacing errors and alignment. Photographs, table, graphs, diagram. (S14)

178-S. Recent Developments in Rolling Gear Testers. J. A. Horne. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 379-404; disc., p. 404-413.

Range and accuracy of instruments for determination of backlash and eccentricity and smoothness of tooth action. Diagrams, photographs, graphs. 3 ref. (S14)

179-S. Metrology in the Horological Industry. K. H. Hume. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 455-465; disc., p. 466-467.

Measuring equipment and procedures associated with the manufacture of instruments, clocks and watches. Photographs, diagram. 3 ref. (S14)

180-S. Small Screw Threads. P. R. Brierley. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 469-482; disc., p. 482-483.

National and international systems; thread forms; measuring techniques. Table, graphs, diagrams. (S14)

181-S. The Precise Establishment of Long Co-Ordinates in Factories. O. S. Reading. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 485-488, 490-493; disc., p. 488-489.

Optical methods for avoiding flexure errors in large-sized jigs for defining straight lines. Photographs, diagram. (S14)

182-S. Report on the Measurement of Large Work-Pieces, Measuring Equipment, Systems of Fits Over 500 Mm. N. N. Sawin. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 495-526; disc., p. 583-588.

Wear and margins of error of fixed gap gages. Pin, internal and projecting hook gages. Diagrams, tables, photographs. 9 ref. (S14)

184-S. Report on an Investigation for the British Standards Institution Into the Accuracy With Which Industry Measures Large Dimensions. P. W. Harrison. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 527-536; disc., p. 583-588.

Degree of accuracy of measurements made in engineering workshops with particular reference to large work-pieces up to nearly 80 in. in size. Diagrams, graphs, table. (S14)

185-S. Some Problems of Large-Scale Measurement in the Heavy Electrical Industry. T. P. Jolly. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 537-561; disc., p. 583-588.

Description and use of shop length gages, telescopic point gages, diameter - measuring instruments. Photographs, diagrams, graphs, tables. (S14)

186-S. Large Scale Metrology. V. B. Hessen. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 563-576; disc., p. 583-588.

Instrumentation and measuring system for positioning equipment components over distances up to 30 ft. Description and principle of application of a Tape Gage, which allows repeated measurements over a predetermined length to an accuracy of ± 0.003 in. up to a maximum of 20 ft. Diagrams, table. (S14)

187-S. A New Method for Checking the Profile of Large Marine Propellers. P. W. Harrison and H. C. Garlick. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 577-582; disc., p. 583-588.

Measuring techniques for determining accuracy of form of ship propellers. Diagrams, photographs, table, graph. (S14)

188-S. Microgeometric Testing of Surfaces. A. Mirau. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 589-598; disc., p. 651-664.

Methods used in France for testing the finish of surfaces by inter-

ferometric, pneumatic and optical methods. Diagrams, photographs, micrographs, graph. (S15)

189-S. The Trend of Surface Measurement. R. E. Reason. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 599-620; disc., p. 651-664.

Equipment and methods to measure errors of straightness, wavyness or roundness; profile comparators. Flowsheet, diagrams, graphs, photographs, table. 9 ref. (S15)

190-S. Two Recent Developments for Accurate Measurement of Surface Roughness. A. F. Underwood. Paper from "Engineering Dimensional Metrology". Her Majesty's Stationery Office, v. II, p. 621-628; disc., p. 651-664.

Development of a roughness standard which could be used to check and calibrate any stylus-type surface roughness measuring device. Design of electronic surface measuring instrument. Photographs, graph, diagrams. 2 ref. (S15)

191-S. (Dutch.) **Echo-Impulse Method Very Suitable for the Investigation of Difficult Materials.** T. van der Klis. *Bedrijf en Techniek,* v. 10, no. 228; *Electronica section,* v. 8, no. 175, May 21, 1955, p. 81-83.

Principle and design of testing device; its uses in detecting defects and measuring thicknesses. Diagrams, photograph. (S13)

192-S. (Dutch.) **Measuring the Thicknesses of Materials.** R. Smit. *Bedrijf en Techniek,* v. 10, no. 229; *Electronica section,* v. 8, no. 176, June 4, 1955, p. 89-92.

Design and operation of X-ray, beta-ray and gamma-ray thickness meters. Diagrams, graph. 8 ref. (S14)

193-S. (French.) **Study of the Weight of Sheets.** Jolin. *Centre de Documentation Sidérurgique Circulaire d'Informations Techniques* v. 12, no. 5, 1955, p. 1031-1043.

Determination of the weight variation of a sheet or batch of sheets in relation to the theoretical weight corresponding to the nominal thickness. Graphs, tables. (S14)

194-S. (French.) **Industrial Control by Ultrasonics.** Jean Daurat. *Métallurgie et la construction mécanique,* v. 87, no. 5, May 1955, p. 379, 381, 383, 385.

Cast barium titanate ceramics; correlating mechanical - resonance and shearing tests; control of brazed contacts. Micrographs, tables, graphs. (S13)

195-S. (German.) **A Process of Measuring Constant Magnetic Fields and Constant-Field Differences and Its Application in the Research and Technology of Metals.** Friedrich Föster. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 358-370.

Principle of operation and design of precision-field strength meter and its uses in geophysics, nondestructive testing, sorting, electrochemical and electrical engineering. Graphs, diagrams, photographs. 20 ref. (S13, S10)

196-S. (Norwegian.) **Methods and Instruments for Measuring Technical Surfaces.** Sivilingenir Chr. Kjoergaard Nissen. *Teknisk Ukeblad,* v. 102, no. 21, May 26, 1955, p. 435-439.

Different optical and interference methods of evaluating surface condition. Diagrams, micrographs, photographs. (To be continued.) (S15)

197-S. (Norwegian.) **Methods and Instruments for Measuring Surfaces.** Kjoergaard Nissen. *Teknisk Ukeblad,* v. 102, no. 22, June 2, 1955, p. 463-469.

Methods and devices for determining the surface roughness and surface texture of different materials. Diagrams, graphs, photograph. 8 ref. (S15)

198-S. (Polish.) **The Significance of Microstructural Examination in Metallurgical Investigations.** W. Haczewski, Z. Wojcik and J. Ogerman. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 179-182 + 4 plates.

Causes of premature deterioration of railroad rails, cracking of carburized alloy steel gears and deep drawing failures of low carbon steel sheet products. Micrographs, graphs, photographs, diagrams. (S21, M27, AY, CN)

199-S. (Polish.) **Spectral Analysis.** W. Klimecki. *Prace Instytutow Ministerstwa Hutnictwa,* v. 7, nos. 2-4, 1955, p. 183-202 + 1 plate.

Steeloscopic, spectrographic and direct spectrometric analytical procedures for major elements of steels, high alloy steels, cast iron, Silumins and lithium in carnallites. Graphs, photographs, tables, 27 ref. (S11, ST, AY, CI, Al)

200-S. (Polish.) **State of Standardization in Metallurgy. Standards of Non-Ferrous Metals.** Marian Sadtowski. *Wiadomosci Hutnicze,* v. 11, no. 6, June 1955, p. 170-173.

Comparison of standards for pressed, rolled, drawn, extruded non-

ferrous sheets, rods, pipes, etc., for refractory materials, and for methods of investigation. Table. (S22)

201-S. Production Control of Quality Steels. Robert W. Graham. *American Iron and Steel Institute, Preprint,* 1955, 23 p.

Analysis of variables in steelmaking and fabrication; control of composition of steels; quality control measures. Photographs, graphs. (S12, S18, D general, ST)

202-S. The Rapid Determination of Cadmium in Plating Solutions. Frank J. Versagi. *Finish,* v. 12, Aug. 1955, p. 29, 51.

Equipment, procedures and materials for polarographic method. Graph. (S11, L17, Cd)

203-S. Industrial Uses of Special-Purpose Computers. A. H. Kuhnel. *Instruments and Automation,* v. 28, July 1955, p. 1108-1113.

Examples for control of a punch machine requiring computed numbers of various gage pieces, control of a milling machine for contour milling of turbine blades, and a special-purpose data processor; Analysis and design of the computer approach. Photographs, diagrams. (S general, G17)

204-S. Process Control Analysis. VI. Analytic Solutions. Millard H. Lajoy and E. Allen Baillif. *Instruments and Automation,* v. 28, July 1955, p. 1114-1118.

For many types of controlled systems, the defining equations are ordinary, linear, and of low order—and have constant coefficients. Conventional analytic solutions of these equations, practical examples. Diagrams. (To be continued.) (S18, S12)

205-S. Ultrasonic Test Detects Enlarged Grains in Some Steel Parts. R. N. Hafemeister. *Iron Age,* v. 176, July 21, 1955, p. 95-97.

Nondestructive ultrasonic testing can detect grossly coarsened grain structure in some finish machined steel parts. Such coarsening, often a result of overheating in heat treatment, can be a factor in service failure. Photographs, micrographs, table. (S13, ST)

206-S. Non-Destructive Testing. II. Ultrasonic Testing. J. M. McLeod. *Iron & Steel,* v. 28, July 1955, p. 339-343.

Importance of shape and orientation of the flaw, grain size, single and double crystal method and surface condition; the use of shear waves, immersed scanning, shadow graph and resonance methods. Applications and acceptance standards. 48 ref. (S13)

207-S. A Furnace Scanning Periscope. Charles Burns. *Iron and Steel Institute, Journal,* v. 180, July 1955, p. 241-247 + 4 plates.

Development of a water-cooled periscope which can be inserted in an openhearth furnace and give an effective viewpoint within the furnace walls. It can be used for still or ciné photography (normal or high-speed) or for direct visual observation. Diagrams, photographs. (S16, D2)

208-S. Open-Hearth Immersion Pyrometers. A. Goodall. *Iron and Steel Institute, Journal,* v. 180, July 1955, p. 247-254.

Review of development through three principal designs; reasons for changes; costs calculated; lines of future development suggested. Tables, diagrams, photographs. 3 ref. (S16, D2)

209-S. Surface Micro-Interferometry. J. W. Perry. *Research,* v. 8, July 1955, p. 255-261.

Survey of the evolution of interferometers on a functional basis, from the simplest unaided-vision forms to the most recent micro-interferometer developments. Graph, diagrams, photographs. 13 ref. (S15)

210-S. Standards for Sheet, Strip and Plate in Aluminium and Its Alloys. H. M. Bigford and E. Elliott. *Sheet Metal Industries,* v. 32, no. 339, July 1955, p. 491-494; disc., p. 494-496.

Efficacy of British standards; variations of properties within standard limits and their effects on manufactured products. Table. (S22, Al)

211-S. The Radiography of Spot Welds in Light Alloy Sheets. N. K. Gardner and E. A. Redwood. *Welding and Metal Fabrication,* v. 23, July 1955, p. 245-249.

Physical examination of the method, equipment, radiographic technique, interpretation of radiographs and costs. Graphs, photographs, radiographs. 2 ref. (S13, K3)

212-S. Analytical Chemistry of Beryllium. Clement J. Rodden and Frank A. Vinci. Paper from "The Metal Beryllium". American Society for Metals, p. 641-691.

Presents, in an orientative manner, some of the adopted methods currently used in the beryllium industry. Diagrams, graph, table, photograph. 67 ref. (S11, Be)

213-S. Statistical Control in Metal-Working Operations. M. Whyte. Paper from "The Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. Pt. II. The Control of Quality in Working Operations". Institute of Metals Monograph and Report Series No. 16, p. 58-68.

Selection, control and sensitivity of routine test. Applications to specific problems. Graphs. 17 ref. (S12)

214-S. (Czech.) **Using Radioisotopes for the Noncontacting Measurement of Rolling Materials.** Jan Petr. *Hutnické Listy,* v. 10, no. 6, June 1955, p. 346-352.

Summarizes methods of the noncontacting measurement, advantages of method using radioisotopes, especially, the use of pure beta-ray sources for thickness of thin sheets and foils. Graph. 11 ref. (S14, F23)

215-S. (French.) **Controlling the Quality of Radiographic Images in the Examination of Welds.** C. Brachet. *Soudage et Techniques connexes,* v. 9, nos. 5-6, May-June 1955, p. 131-139; disc., p. 139-140.

Results of comparative tests conducted on different types of penetrometers. Diagrams, table, radiographs. (S13, K9)

216-S. (Russian.) **Magnetographic Method of Controlling the Quality of Welded Joints.** A. S. Fal'kevich, F. I. Kisliuk, Iu. V. Usenko and V. M. Lubov. *Svarochnoe Proisvodstvo,* 1955, no. 7, July, p. 10-12.

Description and operation of equipment for detection of defects. Photographs, diagrams, graphs. (S13, K9)

217-S. Non-Destructive Testing. I. Surface Condition. J. M. McLeod. *Iron & Steel,* v. 28, June 1955, p. 301-306, 318.

Tests for surface hardness and the detection of surface flaws by the penetrating liquid methods and magnetic particle tests. 85 ref. (S13, Q29)

218-S. Production Control of Quality Steels. I-II. R. W. Graham. *Steel,* v. 137, Aug. 8, 1955, p. 78-79; Aug. 15, 1955, p. 142, 145.

Depicts industrial demand for precise quality control and importance of operating personnel in the program. Photographs, graphs. (S12, ST)

219-S. Use of Spectroanalysis in the Rapid Control Laboratory of a Steel Works. G. Hartleif and H. Kornfeld. *Henry Brutcher Translation No.* 3458, 12 p. (Abridged from *Stahl und Eisen,* v. 75, no. 9, 1955, p. 587-590.) Henry Brutcher, Altadena, Calif.

Adaptation of high-speed spectroanalytical procedures for Al, Cr, Cu, Cb, Mo, Si, Ni and V to the equipment normally available in German routine analysis rapid-control laboratories. Tables, graphs, diagram. 5 ref. (S11, Al, Cb, Cr, Cu, Mo, Ni, Si, V)

220-S. Problems of the Control of Dimension, Shape, and Finish in the Rolling of Sheet and Strip and in the Drawing of Wire. Hugh Ford and J. G. Wistreich. Paper from "The Control of Quality in the Production of Wrought Non-Ferrous Metals and Alloys. Pt. II. The Control of Quality in Working Operations". Institute of Metals Monograph and Report Series No. 16, p. 5-14 + 1 plate.

Definition of the property and methods for measurement; causes of variation of the property and methods of control; technical and economic appraisal of possible methods of control, with reference to tolerated variations. Tables, diagrams, micrographs. 21 ref. (S14, S15, F23, F28)

221-S. (French.) **The Two-Color Pyrometer.** P. Rodicq and G. Maillot. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 477-484.

Manner in which study was conducted indicates reliability of apparatus; results obtained. Diagrams, photographs, graphs. (S16)

222-S. (French.) **Methods for the Determination of Dust Content in the Blast Furnace Gas.** C. G. Thibaut, D. Sanna and F. Douez. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 485-507.

Measurement can be carried out with an approximation of 5% in the whole range of common concentrations from a few mg. per cu. m., in the purified gas, to 100 g. per cu.m., in the raw gas. Diagrams, tables, graphs. (S11, D1)

223-S. (Norwegian.) **Use of Radioactive Isotopes in Metallurgy.** Ulf Been. *Tidskrift för Kjemi Bergvesen og Metallurgi,* v. 15, no. 6, 1955, p. 104-106.

Radioactive isotopes as aids in the study of diffusion, vapor pressure, microstructure, friction, wear, lubrication and the various problems of process metallurgy and radiography. (S19)

224-S. (Russian.) **Spectral Analysis of Slags.** N. V. Buianov. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia,* v. 19, no. 1, Jan.-Feb. 1955, p. 89-93.

Equipment and methods; comparison with other analytical methods. Tables. 30 ref. (S11, B21)

225-S. (Russian.) **Spectrochemical Methods for the Analysis of Open-Hearth Slags for All Basic Components.** O. I. Nikitina. *Izvestiia Akademii Nauk SSSR, Seriia Fizicheskaia,* v. 19, no. 1, Jan.-Feb. 1955, p. 94-96.

Analysis of solid and dissolved slags. Tables. (S11, B21, D2)

226-S. (Book.) **Engineering Dimensional Metrology.** v. I-II. 689 p., 1955. Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2, England. £2 5s 0d.

Thirty-nine papers which were presented at a symposium at the National Physical Laboratory, Teddington, England, from Oct. 21-24, 1953. Pertinent papers are separately abstracted. (S14)

227-S. Inspection Procedures for the Acceptance or Rejection of Incoming Steel Shipments. D. J. Heinlen. *American Society of Mechanical Engineers, Paper No.* 54—A-209, 1954, 8 p. + 7 plates.

Working plan to attack the problem, not only from the inspection standpoint, but also from the specification angle. Tables, photographs, graphs. (S10, S22, ST)

228-S. The Application of Statistics to Simple Fixed-Gage Design. H. C. Charbonneau. *ASME, Transactions,* v. 77, Aug. 1955, p. 949-955; disc., p. 955-956.

The application of statistics to quality control, design and selection of gages, application of unilateral and bilateral theories of tolerances. Tables, graphs, diagrams. (S12)

229-S. Recent Developments in Optical Tooling. K. H. Boucher. *Automotive Industries,* v. 113, Aug. 15, 1955, p. 50-52, 154.

Use of closed circuit television, micro-alignment telescope, targets and a precision check bar for checking major assembly fixtures. Photographs, diagram. (S14)

230-S. On Segregation of Castings by Spectrographic Analysis. II. Kazuo Yasuda and Kiichiro Amano. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 49-54.

Spark method of determining segregation of magnesium, silicon and manganese in wedge-shaped castings of spheroidal graphite cast iron. Diagrams, micrographs, graphs. (S11, CI)

231-S. Application of Ultrasonic Flaw Detection Method for Cast Iron (Fatigue Test). Hiroshi Yamanouchi and Takeshi Inukai. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 55-57.

Tracing of crack propagation and ultrasonic attenuation in cast iron under repeated stress (rotating beam fatigue test). Graphs, echo patterns. (S13, Q7, CI)

232-S. Inspection, Explosion and Breakdown of Boilers and Pressure Vessels. J. Eyers. *Institution of Mechanical Engineers, Proceedings,* v. 169, no. 8, 1955, p. 181-188 + 8 plates; disc., p. 189-203.

Diagnosis of several serious breakdowns and explosions, many of which are caused by low water conditions. Graphs, diagrams, photographs, micrographs. (S21)

233-S. Non-Destructive Testing. III. Radiography. J. M. McLeod. *Iron & Steel,* v. 28, Aug. 1955, p. 397-402.

Location of defects, use of penetrameters, xeroradiography, gammaradiography, examination of welds, castings, thickness measurements and acceptance standards. 62 ref. (S13, S14)

234-S. A Small Pneumatic Pyrometer. A. M. Godridge, R. Jackson, and G. G. Thurlow. *Journal of Scientific Instruments,* v. 32, July 1955, p. 279-282.

Theory of the pneumatic pyrometer, in which gas temperature is determined from density measurements, design and characteristics of a small instrument. Calibration curves covering a wide temperature range (200 to 1550° C.). Use of the instrument. Diagrams, graph. 6 ref. (S16)

235-S. Standard Types of Stainless and Heat Resisting Steels. *Materials & Methods,* v. 42, Aug. 1955, p. 131.

Chemical ranges and limits for 37 types. Table. (S22, SS)

236-S. Metals "Custom-Tailored" Through Controlled Heat Treating. John J. Kennedy. *Metal Treating,* v. 6, July-Aug. 1955, p. 16-18, 39.

Measurement and control of temperature during heat treating operations. Photograph, diagram. (S16, J general)

237-S. Quality Control: A Welding 'Must'. E. C. Osborne. *Welding Engineer,* v. 40, Aug. 1955, p. 38-39, 46.
Hows and wherefores of establishing effective quality control measures in the shop. Photograph, charts. (S12, K general, ST)

238-S. (German.) **Superposition of Diffraction Spots on Radiographs.** F. Ebert and H. G. Diercks. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 335-337.
Diffraction spots from X-ray flow analysis of light metals can be identified by this rapid displacement when the specimen is touched. Diagrams, photograph, radiographs. (S13, M22)

239-S. (German.) **Analysis of the Residues of Pig Iron and Cast Iron. II. Separation of the Isolates.** Adalbert Wittmoser and Wolf-Dietrich Gras. *Archiv für das Eisenhüttenwesen,* v. 26, no. 7, July 1955, p. 379-388.
New method of isolating structural constituents of iron by magnetism and flotation. Tables, diagrams, micrographs, photograph. 17 ref. (S11, M23, CI)

240-S. (German.) **Temperature Measurement in the Open-Hearth Steel Plant.** Günther Boos and Jacob Willems. *Stahl und Eisen,* v. 75, no. 14, July 14, 1955, p. 900-906.
Experiments with immersion thermocouples on three steel grades from tapping to pouring; temperature difference between black and color temperature and conclusions to be drawn for the steel quality; temperature loss during ladling. Graphs. 18 ref. (S16, D2, ST)

241-S. (Italian.) **The Betatron in Industrial X-Ray Inspection.** Bartolomeo Bellion and Carlo Tribuno. *Ricerca scientifica,* v. 25, no. 6, June 1955, p. 1400-1414.
Use and advantages of 31 mev. betatron operating in Turin, Italy. Radiographs, table, photographs, graphs. 12 ref. (S13)

242-S. Results of the Survey of the Study Group on Oil Storage-Tank Failures. Carl H. Samans. *American Petroleum Institute, Proceedings,* sec. III. *Refining,* v. 34, 1954, p. 143-163; disc., p. 179-185.
Study of questionnaires covering 23 failures out of approximately 6000 tanks in service. Failure causes and histories. Tables, diagrams. (S21)

243-S. Some Economic Aspects of the Oil Storage-Tank Failure Problem. F. A. Gitzendanner. *American Petroleum Institute, Proceedings,* sec. III. *Refining,* v. 34, 1954, p. 164-167; disc., p. 179-185.
Failure probabilities, insurance costs versus failure possibilities. Tables. (S21)

244-S. Surface Roughness and the Design Engineer. Joseph Manuele. *American Society of Mechanical Engineers, Paper No.* 55—S-11, 1955, 7 p. + 2 plates.
Important features of the proposed American Standard for surface roughness, waviness and lay. Shows how standard may be used by the engineering department to determine surface-roughness values and the importance of choosing the proper instrument for measuring surface roughness. Graphs, table. (S15, S22)

245-S. Electronic Aids Speed Quality Control. J. M. Thompson and S. Maszy. *Aviation Week,* v. 63, Aug. 29, 1955, p. 56, 59, 61, 62.
Electronic instruments developed for the determination of internal structures and composition of parts and materials. Photographs. (S general)

246-S. Automatic Control of Metallurgical Furnaces. H. C. Dawson. *Canadian Metals,* v. 18, Aug. 1955, p. 20-22, 24-25.
Change-over from hydraulic to pneumatic or electronic control permits greater flexibility with acceptable safety. Diagram, photographs. (S16, S19)

247-S. Ultrasonic Transmission Tester Speeds, Simplifies Production Inspection. N. W. Schubring. *Iron Age,* v. 176, Aug. 4, 1955, p. 87-90.
Where both sides of a test piece are accessible, this nondestructive tester offers the speed, simplicity and economy desired for production inspection. Graphs, diagram, photographs. 4 ref. (S13)

248-S. Thermocouple Measurements in an RF Field. Loren E. Bollinger. *ISA Journal,* v. 2, Sept. 1955, p. 338-340.
In induction heating, the temperature of the heated material can most easily be measured by thermocouples in the range from 1000° K. to ambient conditions. Precautions must be taken to insure that the unavoidable R.F. pick-up by the

thermocouple is sufficiently attenuated to validate the measurement. Filter circuits to accomplish this task are presented and the results discussed. Diagrams, photograph. 8 ref. (S16)

249-S. Intensification of Radiographs. Emery Meschter. *Nondestructive Testing,* v. 13, July-Aug. 1955, p. 13-16.

Simple and rapid method produces significant increases in contrast and speed gains up to six-fold at the price of some increase in graininess. It is of particular value in intensifying radiographs made without fluorescent screens. Graph, table, radiographs. (S13)

250-S. A Test and Inspection Program in the Chemical Industry. Allan W. Gilbert. *Nondestructive Testing,* v. 13, July-Aug. 1955, p. 17-20.

Common flaws and detection methods, personnel training programs, maintenance records. Photographs, tables. (S13)

251-S. How Deep Is That Crack? Henry N. Staats. *Nondestructive Testing,* v. 13, July-Aug. 1955, p. 21-22.

Description and operation of eddy current test unit. Photographs. (S13)

252-S. Standardization in Ultrasonic Testing. C. W. Cline and J. B. Morgan. *Nondestructive Testing,* v. 13, July-Aug. 1955, p. 23-27.

Description and use of standard reference blocks of various aluminum alloys. Graphs, diagrams, photographs. (S13, S22, Al)

253-S. Constant Potential Radiography of Steel at 2 Mev. Stanley S. Stacey. *Nondestructive Testing,* v. 13, July-Aug. 1955, p. 29-32.

Use of a 2.0 mev. constant potential electrostatic X-ray generator in radiography of heavy steel sections gives the radiographer a flexible, intense source of highly penetrative radiation which permits the use of simple, direct techniques free from the inconveniences caused by secondary radiation. Photographs, graphs, diagram. (S13, ST)

254-S. Nondestructive Testing on the Denver and Rio Grande Western Railroad. Clyde O. Penney. *Nondestructive Testing,* v. 13, July-Aug. 1955, p. 33-38.

Inspection procedures for railroad equipment, including fluorescent liquid, magnetic particle and ultrasonic methods. Photographs, micrographs. (S13, ST)

255-S. Automatic Gaging. A. Wiseman. *Steel Processing,* v. 41, Aug. 1955, p. 495-497.

Applications, incorporating into production, in-process and post-process gaging and gage signals. Diagrams. (S14)

256-S. Quality Control in Sheet and Plate Fabrication. Rowland Gardener. *Welding and Metal Fabrication,* v. 23, Aug. 1955, p. 295-298.

Survey of quality control concerning material selection, cleanliness, pattern development, cutting out, forming procedure, jig and fixture accuracy and welding processes and procedures. Photographs. (S12, K general)

257-S. Method of Determining the State of Carbon in Steel. Yu. A. Klyachko and M. M. Shapiro. *Henry Brutcher Translation No.* 3457, 11 p. (Condensed from *Zavodskaya Laboratoriya,* v. 14, no. 5, 1948, p. 549-553.) Henry Brutcher, Altadena, Calif.

Method of separating uncombined carbon from carbide in deposits obtained by anodic dissolution of steel samples, using a heavy liquid. Photograph, tables. 7 ref. (S11, ST)

258-S. Investigation of Sparking-Out Effect and the Influence of Third Elements in Spectroanalysis. I. L. N. Filimonov. *Henry Brutcher Translation No.* 3535, 20 p. (Condensed from *Zavodskaya Laboratoriya,* v. 15, no. 8, 1949, p. 919-936.) Henry Brutcher, Altadena, Calif.

Studies to determine whether sparking-out effect is caused by a change in the excitation conditions or by a real change in composition of the material which is vaporized into the spark. Connection between sparking-out, third element effect and effect of structure. Photographs, diagrams, tables, graphs. 25 ref. (S11)

259-S. Phase Analysis of Steel. II. An Answer to the Discussion on the Author's Paper. A. P. Gulyaev. *Henry Brutcher Translation No.* 3540, 9 p. (Abridged from *Zavodskaya Laboratoriya,* v. 12, nos. 7-8, 1946, p. 646-650.) Henry Brutcher, Altadena, Calif.

Determination of carbides, importance of selecting the right composition of the electrolyte used for anodic solution of the alloy, to match the composition of steel and carbide. Graph. 9 ref. (S11, ST)

260-S. Determination of Gases in Ferrous Metals. II. Apparatus and Microanalytical Procedure for the Determination of Hydrogen by the Vacuum-Heating Method. Yu. A. Klyachko and A. D. Atlasov. *Henry Brutcher Translation No.* 3548, 12 p. (Condensed from *Zavodskaya Laboratoriya,* v. 16, no. 3, 1950, p. 283-290.) Henry Brutcher, Altadena, Calif.

Advantages of vacuum heating over vacuum fusion for determination of gases, chiefly hydrogen, in iron alloys. Diagrams, tables, graph. 7 ref. (S11, Fe)

261-S. (Dutch.) **Tin as a Basic Material for the Tin-Processing Industry.** J. G. Nijkamp. *Metalen,* v. 10, no. 15, Aug. 15, 1955, p. 313-317.

Equipment and methods of testing thickness and mechanical properties of tin and tin plate. Photographs, graphs. (S14, Q general, Sn)

262-S. (French.) **Critical Study of an Apparatus for Measuring Threads.** J. Simonet. *Revue universelle des mines,* v. 11, ser. 9, no. 8, Aug. 1955, p. 381-399.

Description of apparatus, statistical examination of results of measurements. Photographs, diagrams, graphs, table. (S14)

263-S. (German.) **Photometric Determination of Columbium and Tantalum in Steel.** Alois Eder. *Archiv für das Eisenhüttenwesen,* v. 26, no. 8, Aug. 1955, p. 431-435.

Method, operating instructions, exactitude of determination. Table, graphs. 11 ref. (S11, Cb, Ta, ST)

264-S. (German.) **Determination of Silicon in Titanium and Titanium Alloys.** K. Jordan and R. W. Fischer. *Technische Mitteilungen Krupp,* v. 13, no. 2, May 1955, p. 39-43.

Specifications on a highly accurate photometric method of determining silicon in titanium and its alloys. Tables, graphs. 10 ref. (S11, Ti, Si)

265-S. (German.) **Rapid Photometric Analyses in the Plant.** Walter Nielsch. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 8, no. 8, Aug. 1955, p. 369-377.

Designs of Zeiss photometer and auxiliary equipment; specifications on the use of the equipment for analyzing alloys. Photographs, diagram, tables, graph. 70 ref. (S11)

266-S. Controlling Continuous Web Processes. Norman E. Walters. *Automation,* v. 2, Sept. 1955, p. 34-39.

Radiation gages for controlling thickness in production of metallic and nonmetallic sheet materials. Diagrams, photographs, graphs. (S14, F23, ST)

267-S. Testing Errors. G. H. Gardner. *Foundry Trade Journal,* v. 99, Aug. 4, 1955, p. 123-126.

Evaluation of errors to determine the extent to which they occur in routine analytical and physical tests. Tables, diagram. (S12, CI)

268-S. Radioisotopes in Industrial Research. S. E. Eaton. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/146, June 1955, 12 p.

When used in testing they are easy to detect, provide a small, inexpensive, portable source of radiation, can be measured in minute quantities with high sensitivity, and are specific so that they can be traced in the presence of chemically identical atoms. 19 ref. (S19)

269-S. Principles of Electronic Measurement and Control in Industry. H. J. Lindenhovius. *Microtecnic (English Ed.),* v. 9, no. 3, 1955, p. 155-161.

Indicates some of the more typical properties and advantages of electronic methods used in measurement and control. Table, diagrams, photographs. (S14)

270-S. What We Know About Cam and Tappet. *SAE Journal,* v. 63, Sept. 1955, p. 56-65.

Causes of tappet failure observed in engines and their relationship to tappet material. Photographs, micrographs. (S21, Q7, Q9, CI, ST)

271-S. Production Control of Quality Steels. R. W. Graham. *Steel,* v. 137, Aug. 22, 1955, p. 74, 76-77.

Effects of temperature and other processing variables on composition and quality. Graphs. (S general)

272-S. (German.) **Fatigue Fractures in High-Pressure Synthesizing Plants.** K. Daeves and K. F. Mewes. *VDI Zeitschrift,* v. 97, no. 21, July 21, 1955, p. 728-729.

Methods of locating areas of weakness and preventive measures. Diagrams. 1 ref. (S21, Q7)

273-S. (Russian.) **Theory of the Method of Measuring Thickness Using Radioactive Radiation.** A. M. Bogachev, B. I. Verkhovskii and A. N. Makarov. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 808-812.

Determination of accuracy of the method; choice of radioactive isotopes. Graphs, table. 4 ref. (S14, S19)

274-S. (Russian.) **Method and Appa-**

ratus for Measuring Rolled Steel, Using Radioactive Radiation. A. M. Bogachev, B. I. Verkhovskii and A. N. Makarov. *Zavodskaia Laboratoriia,* v. 21, no. 7, July 1955, p. 813-820.

Curves of absorption of beta and gamma radiation in steel. Circuit diagrams, graphs, photographs. 4 ref. (S14, ST)

275-S. (Pamphlet.) **Development of Nondestructive Tests for Structural Adhesive Bonds. Pt. III. Mechanical Impedance Technique.** PB 111678, 39 p. 1955. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $1.00.

Stainless steel and aluminum multi-ply laminates are subjected to vibrations developed by a ferro-electric transducer. Variations in voltage frequency curves occurring when the transducer was applied to satisfactory and defective test specimens are recorded and correlated with the strength of adhesive bonds as shown by later destructive tests performed on the same samples. (S13, K12, Al, SS)

276-S. **Polarographic Analysis for Faster and Better Mill Control.** Hidehiko Mino. *Engineering and Mining Journal,* v. 156, Sept. 1955, p. 97-99.

Small instrument makes analyses of heads, tails, cell-to-cell concentrates and finished concentrates, and cuts sample time to 15 min. and sample cost to 1/18 that of conventional chemical methods. Photograph, graph, diagrams. (S11)

277-S. **Inspection Methods for Metallic Parts.** A. S. Billings. *Finish,* v. 12, Oct. 1955, p. 36-37, 78, 83-84.

X-ray, fluorescent and dye penetrants, magnetic particle, spectroscopy and X-ray metallography are used in production and raw material checks. Photographs. (S general)

278-S. **Quality Control in a Large Foundry in the Automotive Industry.** R. Baggio. *Foundry Trade Journal,* v. 99, Sept. 1, 1955. p. 229-240.

Systematic tests of raw materials and finished products. Photographs, graphs. (S general, E general, CI)

279-S. **Rigidity — The Unknown Cost-Reduction Factor.** C. A. Bierlein. *Mechanical Engineering,* v. 77, Sept. 1955 p. 774-777.

Failure of conventional gaging to show true geometry and value of rigidity in improving this situation. Photographs, diagrams. (S14)

280-S. **Results of an Examination of Metal Specimens From an Excavation of Shamshir Ghar Afghanistan.** Earle R. Caley and Wallace H. Deebel. *Ohio Journal of Science,* v. 55, Sept. 1955, p. 311-314.

The wide variety of alloys and metallurgical techniques, represented by the few specimens, indicate an advanced stage in the art of metallurgy was possible only on the basis of long experience and practice. Tables. (S11, A2, Sn, Cu, CI)

281-S. (French.) **New Proposal for the Standardization of Gray Cast Irons.** Albert Collaud. *von Roll Mitteilungen,* v. 13, nos. 3-4, July-Dec. 1954, p. 75-97.

Primary structure (segregation of graphite) as well as the secondary structure (matrix) of gray cast iron depends on two factors which are completely independent of each other—the physico-chemical composition and the rate of cooling. A more realistic standard is proposed. Tables, graphs. (S22, CI)

282-S. (Hungarian.) **Problems of Sampling Specimens in the Metallurgical Plant.** Robert Forbath. *Kohaszati lapok,* v. 10, no. 8, Aug. 1955, p. 357-360.

Training of technicians, location of layer from which sample is taken, equipment as possible sources of error. Diagram, photograph. 7 ref. (S12)

283-S. (Hungarian.) **Determination of the Manganese Content of Silicate Rock, and Ferrous and Manganese Ores.** Béla Simo. *Kohaszati lapok,* v. 10, no. 8, Aug. 1955, p. 361-365.

Investigations on photometric determination for shortening the determination time and savings on chemicals. Tables, graphs. 7 ref. (S11, Mn)

284-S. (Polish.) **New Standards for Magnesium and Its Alloys.** Boleslaw Chudzio. *Wiadomosci hutnicze,* v. 11, nos. 7-8, July-Aug. 1955, p. 220-223.

Chemical composition and mechanical properties of electrolytic magnesium and forging and casting alloys. Tables. (S22, Mg)

285-S. (Russian.) **Polarographic Determination of Columbium and Titanium From Sulfuric Acid Solutions.** E. I. Krylov and V. S. Kolevatova. *Zadvodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 911-913.

Method tested on titanium-columbium minerals, such as pyrochlore, and on technical columbium pentoxide. Graphs, table. 9 ref. (S11, Cb, Ti)

286-S. (Russian.) **An Experiment in Impact Service Testing.** G. V. Zarochentsev. *Zavodskaia laboratoriia,* v. 21, no. 8, Aug. 1955, p. 965-971.

Process of brittle fracture of rails, comparison of brittleness and cold shortness of differently shaped rails, effect of low temperatures. Diagrams. photographs, graphs, tables. (S21, Q26, Q6, ST)

287-S. **An Approach to the Study of the Effect of Rare-Earth Additions to Steel by Use of Radioactive Tracer Techniques.** C. S. Dumont, J. E. Gates and C. M. Henderson. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 18, 1955, 17 p.

Additions of radioactive misch metal are uniformly distributed throughout the matrix of 25% nickel, 20% chromium melt. Examination of various samples by a combined metallographic - autoradiographic technique showed some slight concentration of radioactivity in the inter-dendritic zones of the as-slow-cooled sample. The forged specimens showed some variation in the degree of concentration between the outer and center sections of the samples. Tables, diagram, micrographs. 5 ref. (S19, F22, M27, SS)

288-S. **Colorimetric Determination of Combined Carbon in Cast Iron.** A. Jamieson. *Foundry,* v. 83, Oct. 1955, p. 132-134.

Method is rapid and apparently not too sensitive to operating variables, is reproducible and of acceptable accuracy. Tables, graphs. (S11, C, CI)

289-S. **How to Get More for Your Steel Dollar.** *Iron Age,* v. 176, Oct. 6, 1955, p. 190-204.

Data for purchasing agents on sheet, strip, bars and shapes. Includes working tolerances, heat treating, and materials inspection. Diagrams. (S22, ST)

290-S. **Materials Engineering File Facts. Standard Aluminum Automotive Alloys in United States and Great Britain.** *Materials & Methods,* v. 42, Oct. 1955, p. 137-139.

Tables on wrought alloys, work hardening wrought alloys and casting alloys cover forms, designations and temper. Tables. (S22, Al)

291-S. **A.I.S.I. Standard Alloy Steel Compositions.** *Metal Progress,* v. 68, Aug. 15, 1955, p. 120B.

A.I.S.I. list, revised Feb. 1954, for openhearth and electric furnace alloy steels. Table. (S22, ST)

292-S. **Radiography of Metals.** *Metal Progress,* v. 68, Aug. 15, 1955, p. 185-194.

Suggestions for equipment and applications of transmission radiography. Tables, graphs. 4 ref. (S13)

293-S. **Surface Finish of Metals.** *Metal Progress,* v. 68, Aug. 15, 1955, p. 82-88.

Establishment of standards and economical application to production. Diagrams, tables, photographs, graphs. (S15, S22)

294-S. **Testing, Inspection and Quality Control.** Don M. McCutcheon. *Metal Progress,* v. 68, Sept. 1955, p. 141-143.

Nondestructive test methods and trends. Photograph. (S general)

295-S. **Quality Control Through Nondestructive Testing With Eddy Currents.** Lee A. Cosgrove. *Nondestructive Testing,* v. 13, Sept.-Oct. 1955, p.13-15.

By measuring electrical conductivities of aluminum alloys, the instrument can sort and classify mixed alloys, disclose improper heat treatment, and detect surface flaws. Photograph, table. 4 ref. (S13, Al)

296-S. **Ultrasonic Flawplotting Equipment—a New Concept for Industrial Inspection.** R. W. Buchanan and C. H. Hastings. *Nondestructive Testing,* v. 13, Sept.-Oct. 1955, p. 17-25.

Equipment combines modulated water stream acoustic coupling, plan and cross-section-view pictorial presentation of flaw images, and manually operated search scanner capable of coping with wide variety of specimen geometry. Photographs, diagrams. 4 ref. (S13)

297-S. **Van de Graaff Radiography of High Density Alloys.** Robert E. Droegkamp. *Nondestructive Testing,* v. 13, Sept-Oct. 1955, p. 27-30.

Studies on hafnium, uranium-base ingots and Zircoloy. Quality is not as good as can be obtained on low-density materials using lower voltage X-ray machines. Table, graph, photographs. 4 ref. (S13, Zr, Hf, U)

298-S. **A Method for the Measurement of DC Magnetic Fields and DC Field Differences and Its Application to Nondestructive Testing.** Friedrich Foerster. *Nondestructive Testing,* v. 13, Sept.-Oct. 1955, p. 31-41. (Translated from the German).

Field strength meter can be converted into field strength difference meter by turning one of two probe coils in opposite direction. Photographs, diagrams. 5 ref. (S13, Fe)

299-S. **Technical Radiography With Beta-Emitting Isotopes.** J. G. Kereiakes and A. T. Krebs. *Nondestructive Testing,* v. 13, Sept.-Oct. 1955, p. 43-44.

Radiographs obtained by using

strontium-90 and yttrium-90 compare favorably with those using gamma-emitting istopes. Photographs. 19 ref. (S13)

300-S. Detection of Flaws in Jet Engine Parts by Ultrasonics. M. J. Bratt and Vernon I. E. Wiegand. *Nondestructive Testing,* v. 13, Sept.-Oct. 1955, p. 45-47, 59.

Shows value in jet engine manufacturing plant of General Electric Co. Photographs. (S13)

301-S. Standards for Welding: Complicated and Confusing. Ray A. Mueller. *Welding Engineer,* v. 40, Oct. 1955, p. 35-40.

Discussion of the 19 extant codes and suggestions for preparing one procedure. Tables, diagrams. (S22, K general)

302-S. Shop Methods for Identifying Some Metals Prior to Welding. Arthur L. Phillips. *Welding Journal,* v. 34, Sept. 1955, p. 877-881.

Even though an expert spark tester can identify constituents and percentages with great accuracy, other methods such as hardness, chip, and spark testing, and use and shape identification should be employed to specify correct alloy for metal joining. Photographs, diagrams. (S10, K general)

303-S. Backing Ring Elimination Permits Ultrasonic Testing and Avoids Cracking at Piping Welds. W. A. Pollock. *Welding Journal,* v. 34, Oct. 1955, p. 954-960.

Pipe welds made without backing rings can be examined by relatively low cost ultrasonic inspection. Also, this technique excludes stress concentration at root of weld and the related hazard of cracking. Photographs, diagrams. 8 ref. (S13, K1, AY)

304-S. Radiography in the Jungles of Sumatra. W. W. Offner. *Welding Journal,* v. 34, Oct. 1955, p. 961-965.

Construction and weld inspection of large oil storage tanks at an ocean fueling station. Photographs, diagrams. (S13, K1, CN)

305-S. Product Standards for Die Castings. Alan G. Dimond. *Western Machinery and Steel World,* v. 46, Sept. 1955, p. 78-82.

Tolerances being released by American Die Casting Institute. Photographs, diagrams, graphs. (S22, E13)

306-S. Study of the Buoyancy Method of Phase Analysis for Carbon in Steels. Yu. A. Klyachko and M. M. Shapiro. *Henry Brutcher Translation No.* 3526, 16 p. (Abridged from *Zavodskaya laboratoriya,* v. 16, no. 10, 1950, p. 1173-1182.) Henry Brutcher, Altadena, Calif.

Prevention of changes in carbon content of carbide residue obtained by electrolytic solution; changes in iron content of the residue during preparation and separation of heavy liquids; nature of reaction of cementite with solution, and formulas expressing it. Tables, X-ray diffraction patterns, graphs, micrographs. 6 ref. (S11, ST)

307-S. Isolation of Carbide Phase Under Constant Conditions. N. M. Popova and M. F. Rybina. *Henry Brutcher Translation No.* 3567, 6 p. (Abridged from *Zavodskaya laboratoriya,* v. 14, no. 5, 1948, p.555-557.) Henry Brutcher, Altadena, Calif.

A new apparatus for anodic solution of steel samples with continuous removal of deposit in a stream of cooled electrolyte. Diagram, photograph, table. (S11, ST)

308-S. (French.) **Application of Tolerance Rules in the Arms Factory.** R. de Gunst. *Revue universelle des mines,* v. 11, ser. 9, no. 9, Sept. 1955, p. 428-435.

Characteristics of pieces of arms, main dimensioning and tolerance principles, organizing the work of a research office, benefits derived from correct dimensioning. Diagrams. (S14)

309-S. (French.) **Basis of Dimensional Control in Industry. Checking Parallelepiped Gages.** E. Bodart and J. Simonet. *Revue universelle des mines,* v. 11, ser. 9, no. 9, Sept. 1955, p. 448-460.

Methods of measuring gages by luminous interferences. Principles of interferometers used in laboratories for this work and their precision. Diagrams, photographs, table. (S14)

310-S. (French.) **French Methods and Apparatus for Measuring the Finish of Surfaces.** André Mirau. *Revue universelle des mines,* v. 11, ser. 9, no. 9, Sept. 1955, p. 461-469.

Describes a pneumatic examining instrument, the use of calibrated specimens, three microscopes using luminous interferences, and other methods for measuring surface roughnesses. Diagrams, graph, photographs, micrographs. (S15)

311-S. (German.) **Trace Analyses With Radioactive Isotopes. Activation Analysis of Phosphorus and Iron.** Wilfrid Herr. *Archiv für das Eisenhüttenwesen,* v. 26, no. 9, Sept. 1955, p. 523-526 .

Fundamentals of activation anal-

ysis, its most important advantages, drawbacks and possibilities. Graphs. 11 ref. (S11, S19, Fe)

312-S. (German.) **The Question of Minimum Values for the Breaking Elongation and Yielding Point When Accepting Rolled Products From Mass Structural Steel.** Stefan Kronmarck. *Metallurgie,* v. 5, no. 7, July 1955, p. 212-214.

Contribution to establishment of technical standards, quality specifications and terms of delivery for mass structural steel. Graphs, table. (S22, ST)

313-S. (German.) **The Analytical Determination of Indium for the Operational Control of the Wet Metallurgical Zinc Production.** Wolfgang Zimmer. *Metallurgie,* v. 5, no. 7, July 1955, p. 214-216.

Serviceable method described; reference made to unsuccessful methods. Tables, photograph. 6 ref. (S11, In, Zn)

314-S. (German) **Influence of Machine Tool Materials and Tools on the Quality of the Tooth Surface. I. Measuring Devices and the Roughness of Tooth Surfaces.** W. Hagen. *VDI Zeitschrift,* v. 97, no. 25, Sept. 1, 1955, p. 849-859.

Methods of roughness determination, influence of the method of machining and tools on the surface finish. Micrographs. 5 ref. (S15, G17)

315-S. (German.) **Determination of Small Quantities of Thallium in Lead. Extraction of Thallium (III)-Chlorides by Isopropyl Ether.** Kaarina Lounamaa. *Zeitschrift für analytische Chemie,* v. 147, no. 3, 1955, p. 196-198.

Thallium as a chloride is extracted from a solution oxidized by bromide and then iodometrically titrated. Tables. 7 ref. (S11, T1, Pb)

316-S. (Russian.) **Transactions of the Ninth-All-Union Conference on Spectroscopy.** *Izvestiia akademii nauk SSSR, seriia fizicheskaia,* v. 19, no. 2, 1955, p. 1-248.

Third in a series of reports pertaining to applications of spectral analysis in metallurgy. (S11)

317-S. (Book.) **Specification Handbook.** 5th Ed. 139 p. North American Smelting Co., Marine Terminal, Wilmington, Del.

Compilation of specifications issued by government agencies and metallurgical societies on standard brass, bronze, aluminum, foundry alloys, and fabricated shapes. (S22, Cu, Al)

318-S. **Roll-Setting Method of Automatic Control of Gauge in Hot and Cold Rolling Mills.** R. B. Sims and K. H. Slack. *Institution of Mechanical Engineers, Proceedings,* v. 169, no. 11, 1955, p. 255-262; disc., p. 262-268 + 2 plates.

Controller, experiments which demonstrate that method is capable of consistent rolling to close tolerances. Graphs, table, diagrams, photographs. 8 ref. (S14, F23)

319-S. **The Use of Artificially Radioactive Isotopes in the Study of the Processes of the Production of Steel and Iron.** A. M. Samarin. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/707, July 1955, 28 p. (Translated from the Russian.)

Applicable in determining thermodynamic functions and kinetics of metallurgical reactions and in disclosing mechanism of separation of admixtures in solidification of steel and alloys. Diagrams, graphs. 33 ref. (S19, P12, N12, ST)

320-S. **Statistical Methods in Metallurgy.** Ulick R. Evans. *Metallurgia,* v. 52, no. 311, Sept. 1955, p. 107-111.

Validity tests of data; reproducibility of results; histograms and other forms of graphical representation. Graphs. 10 ref. (S12)

321-S. **Standard Stainless Steels, Wrought and Cast.** *Metal Progress,* v. 68, Oct. 1955, p. 104B.

Types, composition, S.A.E. designations. Table. (S22, SS)

322-S. **Influence of Forging on Phosphorus Segregation in Steel. Use of Radio-Active Isotopes.** A. Kohn and J. Doumerc. *Metal Treatment and Drop Forging,* v. 22, Sept. 1955, p. 387-394.

Auto-radiographic techniques used to establish magnitude of segregation in ingot containing 0.42% carbon and 0.21% phosphorus. Photographs, radiographs, diagram, graph. 3 ref. (S19, F22, ST)

323-S. **Metal Selector.** *Steel,* v. 137, Oct. 10, 1955, 10 p.

Specifications and uses for 542 widely used metals. Tables. (S22, AY, SS, CI, Zn, Ti, Al, Cu, Mg)

324-S. (English.) **The Spectrographic Determination of Germanium in Coal and Flue Dust.** G. J. Pitt and M. F. Fletcher. *Spectrochimica Acta,* v. 7, no. 4, Sept. 1955, p. 214-218.

Good accuracy achieved both with flue dusts containing at least 0.3% and with coal ashes containing at

least 25 p.p.m. Table. 10 ref. (S11, Ge)

325-S. (French.) **Study of Some Phenomena Observed on Metallic Specimens Irradiated in the Air by Deuterons of About Three M.E.V.** A. Kohn and J. Doumerc. *Journal de physique et le radium*, v. 16, nos. 8-9, Aug.-Sept. 1955, p. 649-653.

Validity of method for determining traces of carbon in specimens of iron by brief irradiation in a flux of three m.e.v. deuterons. Autoradiograph, graphs, table. 2 ref. (S11, C, Fe)

326-S. (German.) **New Ways of Investigating Gases in Steels.** W. Koch. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 100, nos. 7-8, July-Aug. 1955, p. 225-229.

Determination of carbon monoxide, hydrogen, oxygen and nitrogen; solubility diffusion speed; the relation between the temperature and gas liberation. Graphs, diagrams. (S11, ST)

327-S. (German.) **Further Development in Vacuum Hot-Extraction Analysis.** Heinrich Feichtinger. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 100, nos. 7-8, July-Aug. 1955, p. 230-238.

Hot extraction apparatus for use in conjunction with graphite or high-frequency furnaces. Photographs, diagrams, table. 12 ref. (S11)

328-S. (German.) **Oxygen Determination in Steels.** Michel Olette and Mireille Hanin. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben*, v. 100, nos. 7-8, July-Aug. 1955, p. 238-244.

Data resulting from modification of the existing method of oxygen and nitrogen determination in steel with a reference to work done by U. S. Bureau of Standards. Photographs, diagrams, tables. 11 ref. (S11, ST)

329-S. (German.) **Scheme Proposed for the Unification of Auxiliary Measuring Instruments in the Roll-Turning Department.** Otto Müller and Gerhard Beier. *Metallurgie*, v. 5, no. 6, June 1955, p. 203-205.

Explanation of the working and application of standard percentage tables. Diagrams, table. (S22, G11)

330-S. (German.) **Influence of Material, Machine, and Tools on the Surface Condition of Gear Tooth Flanks. II. Roughness of the Tooth-Cutting Tools.** W. Hagen. *VDI Zeitschrift*, v. 97, no. 27, Sept. 21, 1955, p. 956-959.

Data of roughness measurement; instrument applied. Micrographs, photographs. 5 ref. (S15)

331-S. (Hungarian.) **Practical Problems of the X-Ray Testing of Steel Castings.** Rezsö Kottra. *Kohaszati lapok*, v. 10, no. 9, Sept. 1955, p. 197-205.

Testing methods on basis of the literature; gamma ray testing; practical suggestions on examination of thin and thick-walled castings. Photographs, diagrams, radiographs. 6 ref. (S13, CI, ST)

332-S. (Hungarian.) **Determination of the Lead Content in High-Speed Steels.** Imre Bozsai and Karolyné Szabados. *Kohaszati lapok*, v. 10, no. 9, Sept. 1955, p. 423-424.

Improvement of existing methods; details of the process. Tables. (S11, Pb, TS-m)

333-S. **Antidotes for Sleeve Bearing Failures.** Anthony F. Kaminskas. *Iron and Steel Engineer*, v. 32, Oct. 1955, p. 82-89; disc., p. 89.

Considers failures due to improper maintenance, which can be more specifically attributed to insufficient clearance, poor alignment, dirt, overloading and high temperature. Photographs, diagrams, graphs. (S21, SG-c)

334-S. (English.) **A Method for Isolating Carbide in Carbon and Low Alloy Steel.** Helfrid Modin. *Jernkontorets annaler*, v. 139, no. 8, 1955, p. 516-520.

Carbide particles, extracted by dissolving the ferrite in 50% nitric acid, are suitable for the study of their appearance, lattice structure and chemical composition. Electron microscopic examination showed the carbide had not been noticeably attacked. 2 ref. (S11, M27, AY, CN)

335-S. (Spanish.) **New Techniques of Chemical Analysis in Metallurgy.** Ramon Suarez Acosta. *Instituto del hierro y del acero*, v. 8, no. 36, Apr.-June 1955, p. 171-183.

Describes new reagents and new instrumental, optical, potentiometric and electrolytic methods for high-speed and precision chemical analysis of various metallurgical processes. Table, graphs, diagrams. 54 ref. (S11)

336-S. (Spanish.) **Testing of Materials by Ultrasonic Methods. II.** Jose Ors Martinez. *Instituto del hierro y del acero*, v. 8, no. 36, Apr.-June 1955, p. 184-201.

General methods used for generating ultrasonics and some studies conducted on measuring rates of

propagation and determining elastic constants. Principal types of apparatus now in use for localizing defects in acoustically conductive materials, their classification and interpretation. Diagrams, tables, photographs, oscillograms. 24 ref. (S13)

337-S. The Sensitivity of Electron Diffraction as a Means of Detecting Thin Surface Films. I R. C. Newman and D. W. Pashley. *Philosophical Magazine,* v. 46, 7th ser., no. 380, Sept. 1955, p. 927-940 + 4 plates.

Radio-active technique is used to determine thickness of silver bromide and copper deposited on smooth surfaces of silver single crystals. Tables, graph, photographs. 11 ref. (To be continued.) (S14, Cu, Ag)

338-S. (Czech.) **Potentio-Coulombometric Determination of Small Quantities of Carbon in Steels and Carbides.** Miroslav Sicha. *Hutnické listy,* v. 10, no. 9, Sept. 1955, p. 535-542.

Very sentitive method successfully employed in mirco-laboratory for routine analyses. Table, diagrams, graph. 5 ref. (S11, C-n, ST)

339-S. (Czech.) **Mathematical Statistics in Metallurgy.** J. Janko and M. Knotek. *Hutnické listy,* v. 10, no. 9, Sept. 1955, p. 542-549.

Explains use of statistics in various processes and fundamental types of distribution. Graph. 5 ref. (S12)

340-S. (French.) **Automation in Industrial Measuring.** *Métallurgie et la construction mécanique,* v. 87, no. 9, Sept. 1955, p. 713, 715-717.

General outline of the essential points of measuring in production processes, applications and classification of types of measurements. Photographs, diagrams. (To be continued.) (S14)

341-S. (German.) **Investigation of the Capacity of a 15-M.E.V. Betatron in the Radiography of Steel.** Hermann Möller, Walter Grimm and Helmut Weeber. *Archiv für das Eisenhüttenwesen,* v. 26, no. 10, Oct. 1955, p. 603-609.

Includes graphs, photographs. (S13, ST)

342-S. (German.) **Present State of the Temperature Control of Steel Melts and During Pouring.** Kurt Guthmann. *Stahl und Eisen,* v. 75, no. 20, Oct. 6, 1955, p. 1317-1324.

Immersion thermocouples, insulation defects, calibration, optical pyrometry, true tapping and pouring temperatures, alloy additions and radiating power of melt. Graphs, diagrams, photographs, table. 13 ref. (S16, D9, ST)

343-S. (German.) **X-Ray Spectroanalysis by Use of Counting Tube.** Gerhard Lang. *Zeitschrift für Metallkunde,* v. 46, no. 9, Sept. 1955, p. 616-620.

Absorption analysis, devices for X-ray spectro-analysis, analytical methods used in industry. Photographs, diagram, graph. 19 ref. (S11)

344-S. (Russian.) **Spectral Analysis of Titanium for Determination of Impurity Content.** Sh. G. Melamed. *Zavodskaia laboratoriia,* v. 21, no. 9, 1955, p. 1066-1070.

Preparation of standard specimens, determination of volatile impurities, general procedures. Tables, diagram, spectrographs. 3 ref. (S11, Ti)

SECTION T

APPLICATIONS of METALS in EQUIPMENT and INDUSTRY

1-T. High Alloy Castings in Heat Treating Resist High Temperature Conditions. *Industrial Heating,* v. 21, Oct. 1954, p. 1999 + 4 pages.

Successful industrial applications of three basic groups of heat resistant alloy castings and examples to show how they provide various combinations of mechanical properties and hot gas corrosion resistance. Photographs. (T5, R9, J general, CI)

2-T. Carbide Tools for Non-Cutting Uses. J. Witthoff. *Metal Treatment and Drop Forging,* v. 21, Oct. 1954, p. 456-462.

Advantages of using sintered carbides for dies, punches and other forming tools. Photographs, tables. (T6, H15, C-n)

3-T. Some Tests on the Stability of 25-20 Stainless Steel for Analytical Weights. E. R. Harrison. Commonwealth of Australia, Dept. of Supply, Defence Standards Laboratories Technical Note 18, Dec. 1953, 7 p.

Stability and corrosion resistance are satisfactory. Table, graphs. 5 ref. (T8, SS)

4-T. Large Diameter Aluminium Tubes in Structures. Cedric Marsh. *Engineer,* v. 198, Oct. 29, 1954, p. 584-586.

Use of tubes formed from sheet as a structural medium, economic and design reasoning for its application. Diagrams, graphs. (T26, Al)

5-T. Stiffened-Panel Construction With Light Alloys. *Engineering,* v. 178, Oct. 29, 1954, p. 570-571.

Fabrication and welding methods of transport units. Photographs, diagrams. (T21, K general, EG-a)

6-T. Pressure Vessel Design. New Alloys for Multi-Layer Vessels. G. E. Fratcher. *Petroleum Refiner,* v. 33, Nov. 1954, p. 137-141.

Development and construction of low-alloy vessels and their testing. Graphs, tables. (T25)

7-T. A Look Ahead in Vessel Design. E. W. Jacobson. *Petroleum Refiner,* v. 33, Nov. 1954, p. 148-155.

Corrosion, brittle fracture, high-temperature creep, graphitization and hydrogen penetration. Photographs, diagrams, tables, graphs. 18 ref. (T26, R general, Q26, Q3, N8)

8-T. Knotty Materials Problems for Structural Efficiency Posed by Jet Age Speed Boost. Spencer L. Shaw. *Western Metals,* v. 12, Nov. 1954, p. 59-61.

Problems posed by aerodynamic heating in future aircraft. Diagrams, graphs, tables. (T24)

9-T. (Russian.) Improvement in Bearings Lined With Lead Bronze. Iu. Ia. Zil'berg. *Vestnik Mashinostroeniia,* v. 34, no. 10, Oct. 1954, p. 28-30.

Application of protective layer of lead-tin-antimony alloy (2.5% Sb, 1.5% Sn, 96.0% Pb) in thicknesses from 20 to 55 microns, to the lead-bronze lining of bushings for heavy-duty diesel tractor bearings. Diagrams, photograph, photomicro- (SS, SG-g, h)

10-T. The Use of Semiconductors in Thermoelectric Refrigeration. H. J. Goldsmid and R. W. Douglas. *British Journal of Applied Physics,* v. 5, Nov. 1954, p. 386-390.

Theory, development of thermocouple consisting of bismuth telluride, Bi_2Te_3 and bismuth, capable of maintaining 26° C. of cooling. Graphs, diagrams. 13 ref. (T27, S16, Bi, Te)

11-T. The Aluminum Body of the New Dyna-Panhard Automobile. J. J. Baron. *Henry Brutcher, Altadena, Calif., Translation no.* 3381, 24 p. (From *Aluminium,* v. 30, no. 5, 1954, p. 183-194.)

Previously abstracted from original. See item 221-T, 1954. (T21, Al)

12-T. (Book.) Handbook of Aeronautics, No. 2. Component Design. 4th Ed. 207 p. 1954. Sir Isaac Pitman

& Sons, Ltd., Pitman House, Parker St., Kingsway, London, W.C. 2, England. Pitman Publishing Corp., 2 West 45th St., New York. $7.50.

Aircraft structures. Rivets and riveting techniques. Air conditioning and pressurization. Control systems. Fuel systems. (T24, K13)

13-T. (Book.) **The Science of Dental Materials.** Eugene W. Skinner. 4th Rev. Ed. 456 p. 1954. W. B. Saunders Co., Philadelphia, Pa. $7.50.

Physical materials; plaster and dental stone; prosthetic materials; denture resins; nonmetallic materials; porcelain and silicate cement; self-curing resins; amalgam; casting procedures; gold and chromium alloys. (T10, Cr, Au)

14-T. Ryerson Practices What it Preaches. *Steel Horizons,* v. 16, Fourth quarter, 1954, p. 6-7.

Use of stainless steel for factory structures. Photographs. (T26, SS)

15-T. (French and German.) **Use of Brass and German Silver in the Clock and Watch-Making Industry.** W. Brandt. *Pro-Metall,* v. 6, no. 41, Oct. 1954, p. 403-410.

General survey of Swiss production. Photographs, table, micrograph. (T9, Cu, Zn, Ni)

16-T. (Portuguese.) **Cast Iron Crucibles.** Lino Afonso de Lacerda Santos. *ABM (Boletim da associacao brasileira de metais),* v. 10, no. 34, Jan. 1954, p. 23-34.

Design and shape of crucibles, molding processes and compositions satisfactory for replacing graphite crucibles for metal melting. Diagrams, tables, photograph. 2 ref. (T5, CI)

17-T. Sodium, a New Processing Tool. Marshall Sittig and A. S. Hawkes. *Petroleum Refiner,* v. 33, Dec. 1954, p. 193-196.

Unique combination of physical and chemical properties has resulted in a variety of new uses for it in the petrochemical and refining industries. Diagrams, graph. 12 ref. (T29, Na)

18-T. Industrial Hygiene. H. H. Schrenk. *Industrial and Engineering Chemistry,* v. 46, Dec. 1954, p. 99A-100A, 102A.

Zirconium a "new" metal is nontoxic and shows therapeutic value. The metal is used in bone repair. 2 ref. (T10, Zr, La, Ta, Nb)

19-T. Magnesium in the Fabrication of Guided Missiles. A. J. Bell. *Light Metal Age,* v. 11, Dec. 1954, p. 25-27.

Advantages, limitations and design considerations for use of magnesium alloys. Photographs. (T2, Mg)

20-T. Titanium in Jet Engines. D. C. Goldberg. *Modern Metals,* v. 10, Dec. 1954, p. 42-43.

How titanium holds the key to supersonic flight. Photographs. (T25, Ti)

21-T. Photographs in Aluminum. *Modern Metals,* v. 10, Dec. 1954, p. 55-57.

New Metalphoto process produces almost any image or pattern on anodized plates. Diagrams. (T9, L19, Al)

22-T. Engineering Practice for Selecting Materials and Proportioning Components Operating at High Temperatures in the Steam Power Industry. H. A. Wagner and J. A. Blecki. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 106-121.

Factors and their interrelationships which must be considered. Graphs, diagram, table. 7 ref. (T25, AY)

23-T. Criteria in the Selection of Materials for Aircraft Gas-Turbines. H. Hanink and L. Luini. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 122-147.

The need of increasingly effective cooperation of designers and metallurgists in providing materials for more efficient power plants. Photographs, diagram, graphs, table. (T25, SG-h)

24-T. Fabrication of High Temperature Alloy Steel Piping Suitable for Central Station and Oil Refinery Service. R. W. Emerson. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 184-218.

Metallurgical characteristics of piping materials, fabricating operations, heat treatments, welding inspection methods. Table, graphs, micrographs, photographs. (T29, T1, F general, J general, K general, S general, AY)

25-T. (French.) **Sets of Extruded Bars in First and Second Class Installations. III.** René Rols. *Revue de l'aluminium,* v. 31, no. 214, Oct. 1954, p. 307-313.

Electrodynamic forces in extruded bars, arrangement of bars, spacing, mounting of conductors. Drawings, photographs. (To be continued.) (T1, Al)

26-T. (German.) **Use of Aluminum in Motors and Brakes.** K. Schneider. *Aluminium,* v. 30, no. 12, Dec. 1954, p. 521-528.

Experiences with aluminum engine and brake parts in Germany and the U.S.A. Tables, photographs, graphs. 21 ref. (T25, T21, Al)

27-T. Steels for High Temperature Steam Pipes. J. M. Robertson. *Alloy Metals Review,* v. 8, Dec. 1954, p. 2-7.

Factors influencing behavior of medium alloy steels at high temperatures. Graph, table. (T27, AY)

28-T. Permeability Tuning, an Electronic Application of Iron Powder Cores. David M. Hodgin. *Metal Powder Association, Proceedings,* v. 2, 1954, p. 84-88; disc., p. 88-89.

Electronic design problems of significance to powder metal producers. Photographs, diagrams. (T1, H general, Fe)

29-T. Origin of the Modern Air-Cooled Cylinder. S. D. Heron. *Metal Progress,* v. 67, Jan. 1955, p. 137-140.

The idea of using aluminum instead of cast iron for the cylinders of air-cooled engines was an important milestone in aircraft development. It apparently originated with an Englishman who was inspired by an unknown Italian; their pioneering work is herewith belatedly acknowledged. Diagrams, photographs. (T25, Al)

30-T. Equivalent Carbide Grades. *Tool Engineer,* v. 34, Jan. 1955, p. 117.

Reference table of ten manufacturers' recommendation for standard grades. Table. (T6, S22, C-n)

31-T. (German.) **New Data on Carbide Core Bits and Drills.** H. Wilde. *Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 99, no. 10, Oct. 1954, p. 188-193.

Advantages of carbide bits and drills, especially of those using spiral cutting edges. Diagrams, photographs, table, graph. (T7, C-n)

32-T. New All-Metal Sandwich Structures. John V. Long and George D. Cremer. *Materials & Methods,* v. 41, Jan. 1955, p. 96-98.

Exhibit high-temperature resistance up to 1500° F., high strength-to-weight ratio and good sound and heat insulation. Photographs, graph, diagram. (T26, T24)

33-T. Modern Food Processing Equipment Utilizes Nickel Stainless Castings for Essential Components. *INCO,* v. 26, Jan. 1955, p. 14-18.

Types of steel for processing various food products. Photographs, table. (T29, SS)

34-T. (Book.) **Master Boiler Makers' Association, Official Proceedings, (Annual Volume),** v. 52, 1954, 161 p. Master Boiler Makers' Association, Albert F. Stiglmeier, Secretary, 29 Parkwood St., Albany, N. Y.

Cleaning, testing, repairing, and maintenance of boilers and parts in steam and diesel systems; cutting, fabrication, and welding of sheet iron parts; maintenance and repair of unfired pressure vessels. (T25, ST)

35-T. The Manufacture and Properties of Automobile Suspension Springs. C. J. Dadswell, J. E. Russell and R. Fielding. *Institution of Mechanical Engineers, Automobile Division, Proceedings,* pt. 3, 1952-1953, p. 119-128 + 2 plates; disc., p. 128-138.

Manufacture and properties of laminated, coil and torsion bar springs. Tables, photographs, graphs. 22 ref. (T7, CN)

36-T. Germanium and Silicon for Electronic Devices. Anthony S. Rugare. *Metal Progress,* v. 67, Feb. 1955, p. 87-91.

Crystals of precise and minute impurity for rugged miniature electronic devices are at present made more easily of germanium than of silicon, but silicon can operate at higher temperatures. Germanium is more efficient at high frequencies. Table, photographs, diagram. (T1, Ge, Si)

37-T. (French.) **Sets of Extruded Bars in First and Second Class Installations. IV.** René Rols. *Revue de l' aluminium,* v. 31, no. 215, Nov. 1954, p. 353-365.

Techniques of mounting bus bars and similar conductors. Photographs, tables. 27 ref. (T1, Al)

38-T. Functions of Materials in Bearing Operation. P. P. Love, P. G. Forrester and A. E. Burke. *Institution of Mechanical Engineers, Automobile Division, Proceedings,* no. 2, 1953-1954, p. 29-39 + 4 plates; disc., p. 40-44.

Bearing design, factors affecting operation, selection of metals. Diagrams, photographs, micrographs, graphs. 16 ref. (T7, SG-c)

39-T. Structural Design With Formed Aluminium Sheet. I. Cedric Marsh. *Light Metals,* v. 18, Feb.

1955, p. 57-59.
Alloys available, economics of folded sections, design formulas. Table, graphs, diagrams. (To be continued.) (T26, Al)

40-T. Try Gray Irons. John L. Everhart. *Materials & Methods,* v. 41, Feb. 1955, p. 90-93.
Properties, applications and cost advantages of various gray iron compositions. Photographs, table, graph. (T general, CI)

41-T. Stainless at Work. Edward W. Hopper and E. A. Schoefer. *Steel,* v. 136, Feb. 21, 1955, p. 74-77.
Use of welded overlays to combat corrosion in paper pulping installations and all stainless construction in food processing equipment. Photographs, table.
(T29, L24, R general, SS)

42-T. Turbines and Tomorrow's Metals. *Steel,* v. 136, Feb. 28, 1955, p. 88-90.
Demands for higher efficiencies and consequently higher operating temperatures impose difficult metallurgical problems. Photographs, graph. (T25, SG-h)

43-T. (German.) **Aluminum Alloys as Bearing Metals.** E. Vaders. *Aluminium,* v. 31, no. 2, Feb. 1955, p. 55-57.
Requirements of bearing metals, development of new alloy for high-thermal and mechanical stresses. Tables. 4 ref. (T7, Al)

44-T. (German.) **Light Alloy Piston and Its Importance for the Aluminum Industry.** Ernst Mahle. *Aluminium,* v. 31, no. 2, Feb. 1955, p. 70-74.
Around 100,000 tons per year are used for piston production. Advances due to alloy developments. Photographs, table, micrographs, graph. 3 ref. (T7, Al)

45-T. Aluminium in the Oil Industry. H. M. Bigford. *Metallurgia,* v. 51, no. 304, Feb. 1955, p. 75-80.
High-thermal conductivity, lightness and durability favor use of aluminum alloys in pipe lines and tanks. Welding characteristics, mechanical properties and corrosion resistance. Tables, photographs, diagram. (T28, K general, M general, R general, Al)

46-T. Aluminium in Electrical Engineering. J. C. Bailey. *Metallurgia,* v. 51, no. 304, Feb. 1955, p. 81-91.
Economic and technical advantages of use as cable conductors, sheathing, bus-bars and windings. Tables, graph, photographs, diagram. 22 ref. (T1, Al)

47-T. (Book.) **Kaiser Aluminum Electrical Conductor Technical Manual.** 192 p. 1954. Kaiser Aluminum & Chemical Sales, Inc., 919 North Michigan Boulevard, Chicago 11, Ill.
Reference book to meet the needs of users of aluminum as an electrical conductor material; physical and mechanical properties.
(T1, P general, Q general, Al)

48-T. Role of Liquid Metals in Nuclear Power Development. J. W. Taylor. *Research,* v. 8, Mar. 1955, p. 102-105.
Potential applications as coolants and heat transfer media, carriers for nuclear fuel, and extraction agents in processing spent fuel. Table. (T25, Na, Li, Pb, Bi)

49-T. Revolution in Rectifiers. Van Caldwell. *Steel,* v. 136, Mar. 21, 1955, p. 116-119.
Manufacture, properties and applications of germanium, selenium and silicon rectifiers. Photographs, diagrams. (T1, Ge, Se, Si)

50-T. A New Toolsteel of High Cutting Capacity. (Digest of "Contribution to the Study of 'Rollodur', A Steel of High Cutting Capacity", by Albert Collaud; *Von Roll Mitteilungen,* v. 11, July-Dec. 1952, p. 73-91.) *Metal Progress,* v. 67, Apr. 1955, p. 152, 154-156.
Previously abstracted from original. See item 85-T, 1953. (T6, TS)

51-T. Uranium as Fissionable Material in Nuclear Reactors. K. Stokland and H. Chr. Neeb. *Henry Brutcher Translation No.* 3475, 15 p. (From *Forsvarets Forsknings Institutt Arbok* III, 1950-1951, p. 17-27.) Henry Brutcher, Altadena, Calif.
Refining of uranium, fabrication of uranium fuel rods. 8 ref.
(T25, U)

52-T. Titanium—1954-55, an Inventory of Progress. C. I. Bradford. *Rem-Cru Titanium Review,* v. 3, Jan. 1955, p. 1-3.
New aircraft and ordnance uses of the metal. (T24, Tl, Ti)

53-T. Titanium—the Tough Lightweight. A. Hurlich. *Army Information Digest,* v. 10, May 1955, p. 30-36.
Applications in military equipment. Photographs. (T2, Ti)

54-T. Structural Design With Formed Aluminium Sheet. III. Cedric Marsh. *Light Metals,* v. 18, Apr. 1955, p. 124-127.
Various sections made from formed sheet and their design to prevent failure. Graphs, tables.
(T26, Al)

55-T. Metals for Short Time Service at High Temperatures. Alan Levy.

Materials & Methods, v. 41, Apr. 1955, p. 117-132.

Selection problems and the materials most suitable for turbojet afterburners, ramjet engines and rockets. Photographs, graph, tables, diagrams. (T25, SG-h)

56-T. Modern Steels for Plastic Moulds and Hobs. R. Groves. *Plastics,* v. 20, Apr. 1955, p. 127-128.

Steel molds and hobs in the plastic industry. Tables. (T29, TS)

57-T. Special Hardenable Iron Developed for Tappets. Herbert Chase. *Automotive Industries.* v. 112, May 1, 1955, p. 52-55.

Development and testing of the hardenable iron. Micrographs, table, diagram. (T7, Fe)

58-T. Application of Germanium Power Rectifiers. R. M. Crenshaw. *Electrical Engineering,* v. 74, May 1955, p. 418-422.

Applications include its use in the chemical, aluminum, steel, titanium and tin reclaiming industries. Graphs, photographs. (T1, Ge)

59-T. Some Recent Developments in Stainless Steels. J. I. Morley. *Iron & Steel,* v. 28, Apr. 1955, p. 143-146.

Three ways of meeting the requirement for a high tensile stainless steel. Photograph, graphs, tables. 4 ref. (To be continued.) (T general, SS)

60-T. Titanium Bolts for Aircraft. *Light Metal Age,* v. 13, Apr. 1955, p. 18-19.

Light-weight titanium bolts equal or exceed performance of present-day, high-strength aircraft bolts. Table, graph, photographs. (T7, Ti)

61-T. The Use of Creep-Resisting Steels in Steam Power Plants. H. W. Kirkby. *Metallurgia,* v. 51, no. 306, Apr. 1955, p. 165-170.

Steels for piping, turbine rotors and blades and bolts. Graphs, tables. 33 ref. (T25, AY)

62-T. How Magnesium Can Simplify Airframe Design. J. P. Donald Garges. *Modern Metals,* v. 11, Apr. 1955, p. 40-42, 44.

Improvement in ductility of the available magnesium alloys has placed them in the acceptable range for aircraft structural applications. Photographs, graph. (T24, Mg)

63-T. Electrical Spotlight Focuses on Aluminum. *Power,* v. 99, May 1955, p. 76-77.

Applications and problems in switchgear, transformers, distribution and rotating machines. Photographs. (T1, Al)

64-T. The Manufacture of Blades, Buckets and Vanes for Turbine Engines. A. T. Colwell. *Steel Processing,* v. 41, Apr. 1955, p. 215-228, 253.

Methods of manufacture and the materials used. Photographs, tables. (T25)

65-T. (German and French.) **Aluminum and Infra-Red Radiation.** W. v. Berlepsch-Valendas. *Aluminium Suisse,* v. 5, no. 2, Mar. 1955, p. 64-69.

High reflective property of aluminum makes it an excellent material for infra-red radiation equipment. Photographs, graphs. (T29, T5, P17, Al)

66-T. British Preferences for Metals in Refinery Equipment. (Digest of "Metals in Oil Refining," by I. H. Thomas; *Journal of the Birmingham Metallurgical Society,* v. 34, June 1954, p. 51-70.) *Metal Progress,* v. 67, May 1955, p. 134, 136, 138, 140.

Metallurgical tests of materials used for refinery equipment in Great Britain. (T28)

67-T. All-Steel Network Grounds Substation. Glen Appleman and S. J. Litrides. *Electrical World,* v. 143, May 2, 1955, p. 59-61.

Details and advantages of all-steel grounding system. Diagrams, photographs. (T1, CN)

68-T. Inclined Hangers as Bridge Stiffeners. E. M. Rensaa. *Engineering Journal,* v. 38, May 1955, p. 615-619.

Studies of design analysis of arches with inclined hangers. Diagrams. 8 ref. (T26, ST)

69-T. Aluminum in Railroad Equipment. G. B. Hauser. *Modern Metals,* v. 11, May 1955, p. 33-34, 36-37.

Applications of aluminum alloys in rolling stock and other equipment. Photographs. (T23, Al)

70-T. New Aluminum Bus Conductor. *Modern Metals,* v. 11, May 1955, p. 38-39.

Mechanical, physical and forming properties. Tables, photograph. (T1, Al)

71-T. The All-Aluminum Dyna-Panhard. *Modern Metals,* v. 11, May 1955, p. 59-62, 64.

Applications and advantages of aluminum alloys in light-weight French automobile. Photographs, graphs. (T21, Al)

72-T. (German.) **Contact Materials on Silver Base With Special Consideration to Their Heat Treatment.** W. Rienäcker, H. Spengler and H. Dittler.

Elektro-Post, v. 8, no. 10, Apr. 8, 1955, p. 157-160.

Hardness and other properties of silver and silver alloys as a function of degree of deformation and heat treatment. Tables, graphs. 15 ref.
(T1, J general, Q general, Ag, SG-r)

73-T. Many Applications for Aluminum in Automatic Drives. Joseph Geschelin. *Automotive Industries,* v. 112, May 1955, p. 62-64, 130, 132.

Use of die cast aluminum parts in the automobile industry. Photographs. (T21, Al)

74-T. Economics of Aluminium Sheet as Cladding for Industrial Buildings. *Engineer,* v. 199, May 20, 1955, p. 694-696.

Thermal transmittance of corrugated aluminum sheeting. Results considered on an economic basis. Photographs, tables, diagrams. (T26, Al)

75-T. Ceramic Raw Materials for the Welding Electrode Industry. William T. DeLong and Harry F. Reid, Jr. *American Ceramic Society Bulletin,* v. 34, June 1955, p. 183-185.

Functions of an electrode coating, materials used, raw material requirements, current material needs for the industry. Tables, diagrams. (T5)

76-T. Beryllium Copper Cuts Forging Die Costs. George H. De Groat. *American Machinist,* v. 99, June 6, 1955, p. 158-159.

Cast beryllium-copper dies give excellent surface finish in "as-cast" condition, reduces die costs and permits the use of various materials. Photographs. (T5, F22, Cu, Be)

77-T. The Development of Metals in the Aircraft Industry. L. K. Brooks. *Australasian Engineer,* 1955, Apr., p. 51-58.

Processing and applications of aluminum, zinc, other alloys and stainless steels. Tables, photographs. (T24, Al, Zn, SS)

78-T. Aluminium-Alloy Bearings. E. A. G. Liddiard. *Engineers' Digest,* v. 16, May 1955, p. 248-252.

Development of aluminum alloy bearings and reasons for wider applications in the future. Micrographs, graphs, table. 6 ref. (T7, Al)

79-T. Rock Drilling With Hard Metals. *Mechanical World and Engineering Record,* v. 135, May 1955, p. 222-226.

Reviews developments in properties of hard metals and discusses choice of composition and grain size for rock-drilling applications, outlines the problems associated with the steel stem and brazing, considers manufacturing procedure and applications. Micrographs, photographs. 1 ref. (T28, EG-d)

80-T. Powdered Iron Applications. J. A. Roberts and G. O. Altman. *Tele-Tech & Electronic Industries,* v. 14, sec. 1, June 1955, p. 94 + 9 pages.

Manufacturing requirements for types of iron, together with physical and electromagnetic characteristics, for guide utilization coils, tuner cores and direction finders. Photographs, table. 17 ref. (T1, H general, Fe)

81-T. Printed Foil Electronic Components. Hubert L. Shortt and Paul Eisler. *Tele-Tech & Electronic Industries,* v. 14, sec. 1, June 1955, p. 102 + 8 pages.

Utilization of printed materials as aircraft de-icing mats, high-wattage resistors, and temperature sensing elements. Photographs, micrographs. (T1)

82-T. (German.) **Experiments on the Granulation of Cast Iron and Pig Iron.** R. Mitsche and E. M. Onitsch-Modl. *Berg und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben,* v. 100, no. 3, Mar. 1955, p. 121-126.

Production of iron granules and shot by pouring molten metal into water. Effects of test conditions on size and shape of the granules. Photographs, tables, diagram. (T2, CI)

83-T. Aluminum in Electrical Engineering. C. H. E. Ridpath. *Aluminium Courier,* 1955, no. 30, June, p. 3-6.

Used in all-aluminum and steel-cored conductors, cables for power, aircraft and communication, gas and oil pressure noses, busbars and many other applications. Table, photographs. (T1, Al)

84-T. Marine Applications. L. M. C. Robinson. *Aluminium Courier,* 1955, no. 30, June, p. 16-18.

Use of aluminum at sea, situation as it exists today, remarks on future progress. Photographs, diagrams. (T22, Al)

85-T. Packaging. J. A. Ambler. *Aluminium Courier,* 1955, no. 30, June, p. 19-21.

Established uses of aluminum in packaging, with some indication of the latest trends. Photographs. (T10, Al)

86-T. Improved Aluminum-Tin Bearing Alloys. E. A. Lancaster. *Cana-*

dian Metals, v. 18, May 1955, pt. 2, p. 44-46.

Developments of high-tin and aluminum-tin for bearing alloys which meet demands of heavy load and high-temperature operation. Photographs, table. 4 ref. (T7, Al, Sn)

87-T. Electrical Contacts in Precious and Special Metals. *Machinery Lloyd (Overseas Ed.),* v. 27, June 4, 1955, p. 79-83.

Applications in industry as solders, photographic materials, fuse wire and electrical contacts. Tables, photographs. (T1, EG-c)

88-T. Postwar Applications of Aluminum in Britain. E. G. West. *Modern Metals,* v. 11, June 1955, p. 38 + 5 pages.

Applications in prefabricated houses and schools, roofing and siding, ships and boats, road transport vehicles, railway cars, farm implements, electrical equipment and containers. Photographs, diagram. (T general, Al)

89-T. Aluminum-Sheathed Power Cable. W. A. Del Mar and E. J. Merrell. *Power Apparatus and Systems,* 1955, no. 18, June, p. 292-298; disc., p. 298-304.

Methods of fabrication used in producing communication and power cable such as billet extrusion, joining of aluminum sheath, use of sinking dies, cable bend testing and corrosion protection of wipes and sheath. Photographs, graphs, tables. 17 ref. (T1, Al)

90-T. Engine Bearings of Aluminum. D. B. Wood. *Railway Locomotives and Cars,* v. 129, July 1955, p. 47, 49.

Basic advantages of solid aluminum bearings and some points of consideration in design. Photographs. (T7, Al)

91-T. Aluminium Roofing and Cladding. H. W. Johnson. *Sheet Metal Industries,* v. 32, no. 338, June 1955, p. 425-432.

Progress in field of roofing and cladding of structures. Use in making tiles, wall facings and spandrels. Photographs, diagrams, tables. (T26, Al)

92-T. Seventy-Five Years of Sulzer High-Pressure Pipe Lines. *Sulzer Technical Review,* 1954, no. 4, 48 p.

Developments in materials, manufacture, joining and use of large pipelines and penstocks. Photographs, diagrams, graphs. (T4)

93-T. The Present Position of Aluminium in Shipbuilding. E. G. West. *Welding and Metal Fabrication,* v. 23, June 1955, p. 194-203.

Alloys for marine use, design factors, economic considerations, working and fabricating methods, properties. Photographs, diagram, table. (To be continued.) (T22, Al)

94-T. Fabrication of Resistance Alloys. William L. Stryker. *Wire and Wire Products,* v. 30, June 1955, p. 668-671, 726.

Production of alloys used in the electrical appliance industry. Photographs. (T1, SG-q)

95-T. (German.) **The Use of Killed Basic Converter Steel for Oil Field Pipes.** Ewald Baerlecken and Werner Scheurer. *Stahl und Eisen,* v. 75, no. 11, June 2, 1955, p. 718-721.

Notched bar impact bending test on DVM specimens in the nonaged and aged condition for temperatures between −140 and +20° C.; in addition, tensile and welding tests on oilfield pipes made of basic converter steel killed by aluminum (DTP steel) and of killed openhearth steel. Possibilities of using killed basic converter steel instead of openhearth steel for oil field pipes. Tables, graphs. (T28, CN)

96-T. (Book.) **Building Materials—Their Elasticity and Inelasticity.** M. Reiner, editor. 560 p. 1954. North-Holland Publishing Co., Amsterdam, Holland. $12.25.

Thirteen papers discussing the many diverse and complex materials that exhibit rheological properties and the way in which rheological knowledge has to be applied to a variety of problems of technical importance. Papers are individually abstracted. (T26, Q general)

97-T. Characteristics and Calibration of Bimetal Releases and Relays. H. Haas. *Engineers' Digest,* v. 16, June, 1955, p. 281-284. (From *Siemens Zeitschrift,* v. 29, no. 2, Feb. 1955, p. 61-68.)

Operating characteristics, effect of working temperature, influence of ambient temperature, calibration of bimetal relays and types of material used in bimetallic releases. Graphs. (T1)

98-T. High-Strength Steel—Aircraft Requirements. Leo Schapiro. *Metal Progress,* v. 68, July 1955, p. 77.

Need for new composition or better processing methods to meet aircraft requirements. (T24, ST)

99-T. High-Strength Steel—Present Limitations. Paul M. Mozley. *Metal Progress,* v. 68, July 1955, p. 78-80.

Limitations on cleaning, plating

and surface conditioning as an illustration of the problems encountered in the use of steel heat treated to high strengths. (T24, ST)

100-T. Titanium Fasteners. Thomas F. Spoehr. *Metal Progress,* v. 68, July 1955, p. 80-81.

Problems involved in the production of titanium bolts to be used in the aircraft industry. Photograph. (T7, T24, Ti)

101-T. Automation in Welding Rod Manufacture. E. C. Wright. *Metal Progress,* v. 68, July 1955, p. 116-118.

Automatic equipment speeds up production, overhead construction of baking ovens saves floor space. Photographs. (T5)

102-T. Aluminum in Electronic Equipment. E. A. Farrell. *Modern Metals,* v. 11, July 1955, p. 35 + 6 pages.

Applications in electrical and electronic components and structures. Photographs. (T1, Al)

103-T. The Use of Indium in High-Vacuum Equipment. F. L. Reynolds. *U. S. Atomic Energy Commission* UCRL-2989, May 1955, 4 p.

The use of indium and indium-coated copper as gasket materials. A simple yet novel valve employing indium that does not use organic materials as vacuum seal. Diagrams. (T7, In)

104-T. (German.) **Directions for the Substitution of Steel and Heavy Nonferrous Alloy Castings by Aluminum Castings.** Hermann Kessler. *Giesserei,* v. 42, no. 12, June 9, 1955, p. 307-309.

Advantages of aluminum castings. Chemical, physical and mechanical properties of cast aluminum alloys as a main factor in selecting fields of substitution. Tables. 4 ref. (T general, Al)

105-T. Use of Galvanized Sheets in Concrete Reinforcement. Irwin A. Benjamin. *American Iron and Steel Institute, Preprint,* 1955, 20 p.

Investigation of the bond of galvanized sheets to portland cement concrete to establish practical uses that could be made of high-tensile corrugated galvanized sheets in the construction industry. Graphs, tables, photographs. 5 ref. (T26, ST)

106-T. Raw Materials in the Automotive Industry. J. S. Anderson. *Australasian Engineer,* 1955, May, p. 60-71.

Detailed survey of materials, with reference to specific applications; requirements of Australian automobile industry. Tables, graph. (T21)

107-T. Some Aspects of Modern Aircraft Materials. H. Sutton. *Royal Aeronautical Society, Journal,* v. 59, July 1955, p. 494-501.

Properties, applications and fabrication of steels and light alloys. Tables, graphs. 14 ref. (T24, ST, EG-a)

108-T. Lighter Autos Down the Road. Leo Swoboda. *Steel,* v. 137, July 18, 1955, p. 106-107.

Use of aluminum in brake drums, trim, radiators, flywheel housings, doors and many other parts. Photograph. (T21, Al)

109-T. The Role of Beryllium in the Atomic Energy Program. Robert E. Pahler. Paper from "The Metal Beryllium". American Society for Metals, p. 14-23.

Applications in nuclear reactors, role of AEC in beryllium production, cost reduction, availability in the U. S. Table, diagram, photographs. 6 ref. (T25, Be)

110-T. The Role of Beryllium in Industry. N. W. Bass. Paper from "The Metal Beryllium". American Society for Metals, p. 24-41.

Applications, beryllium metals, oxides, other beryllium compounds and beryllium as an alloying element. Tables. 13 ref. (T general, Be)

111-T. (French.) **High-Strength Cast Irons Without Special Elements.** J. Pascal. *Métallurgie et la construction mécanique,* v. 87, no. 6, June 1955, p. 479 + 4 pages.

Field of application, composition of cast irons for particular requirement of cast machine parts. Tables, diagrams, graphs, micrographs. 52 ref. (T7, CI)

112-T. (Swedish.) **Heat-Treatable Hard-Alloy Welding Electrodes for High Speed Tools.** Tore Norén. *Svetsaren,* v. 19, no. 4, 1954, p. 8-14.

Physical and mechanical properties, crystal structure and composition, method of heat treatment, field of application. Graphs, micrographs, photographs. 7 ref. (T5, K1, TS)

113-T. New Powdered Material Reduces Bearing Wear. Stanley Hodge. *Iron Age,* v. 176, Aug. 11, 1955, p. 87-89.

Micro-sized particles of a copper-lead mixture, added to the regular machine lubricant, recondition bearings while the machines run. Other uses for the powdered metal mixture include coolant additions for longer tool life and to reduce wear in hy-

draulic valves. Photographs.
(T7, G21, Cu, Pb)

114-T. Switch to Aluminum Overcomes Design Problems. S. S. Stenersen. *Iron Age,* v. 176, Aug. 11, 1955, p. 98-99.

Use of aluminum end frames results in elimination of eddy currents and lighter weight. Photograph, diagrams, table. (T1, Al)

115-T. Applications of Arc-Cast Molybdenum. N. L. Deuble. *Metal Progress,* v. 68, Aug. 1, 1955, p. 77-79.

Molybdenum is currently going into production of magnetron tubes and glass melting furnaces; nearing commercial applications are piercer points for the tubing industry, die casting dies, ramjet nozzles and gas-turbine parts. Photographs.
(T general, Mo)

116-T. Teflon-Impregnated Bearings for Service in Water. H. B. Nudelman and Cord H. Sump. *Metal Progress,* v. 68, Aug. 1, 1955, p. 112-113.

Porous stainless steel bearings impregnated with Teflon are recommended for service where hot water is used for lubrication. Photographs. (T7, SS)

117-T. Aluminum Pistons—A New Approach. C. G. A. Rosen. *Railway Locomotives and Cars,* v. 129, Aug. 1955, p. 64-68.

Application to diesel locomotives requires special design and treatment to avoid ring groove wear. Graphs, diagrams, photographs.
(T7, T23, Al)

118-T. A Guide to Bearing and Bushing Choice. I. Bearing Materials. II. Picking the Right Bearing. J. B. Mohler. *Steel,* v. 137, Aug. 1, 1955, p. 76-78; Aug. 8, 1955, p. 88-89.

Provides and tabulates necessary data. Tables, photographs.
(T7, SG-c)

119-T. (French.) **Cast Metals in Military-Naval Construction and Particularly in the Construction of Propulsive Apparatuses. Conditions for Their Examination and Acceptance.** Jean Tigeot. *Fonderie,* 1955, no. 113, June, p. 4543-4550.

Alloys used in military-naval construction, necessary qualities of different pieces, gamma-ray radiographic testing. Diagrams, radiographs. 4 ref. (T22, T25, T2, S13)

120-T. (French.) **Platinum Metals in Electrical Engineering, Dentistry, and the Jewelry Industry.** K. Ruthardt. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 441-446.

Importance of platinum, palladium and rhodium in the pure and alloyed state. Photographs, tables.
(T1, T9, T10, Pd, Rh, Pt)

121-T. Metallurgical Problems of Modern Steam Turbines and Alternators. F. Buckley. *Engineering Journal,* v. 38, July 1955, p. 919-928.

Problems of the metallurgist in providing materials used in modern steam power plants. Photograph, diagrams. (T25)

122-T. Titanium Fasteners. John Van Hamersveld. *Machine Design,* v. 27, Aug. 1955, p. 169-170.

Results and conclusions obtained from extensive testing program of titanium alloy fasteners and parts to provide data for design evaluation. Photographs. (T7, Ti)

123-T. High Temperature Materials for High Speed Aircraft. II. Metals. *SAE Journal,* v. 63, Aug. 1955, p. 24-35.

Mechanical and physical properties of metals at varying temperatures up to 2400° F. Advantages and disadvantages of cermets and diffusion coatings. Graphs, diagrams, tables.
(T24, P general, Q general, H general, L15, SG-h)

124-T. GM Research Labs Develop New Turbine Bucket Alloy. D. K. Hanink, F. J. Webbere and A. L. Boegehold. *SAE Journal,* v. 63, Aug. 1955, p. 36-38.

Development of composition that combines high strength and low strategic alloy content, and detailed foundry procedures for the alloy. Table, graphs. (T25, E general)

125-T. (French.) **Utilization of Metals of the Platinum Family as Catalysts.** E. F. Rosenblatt, G. Cohn, F. E. Carter, B. Seligman, and L. C. Burman. *Revue de metallurgie,* v. 52, no. 7, July 1955, p. 529-536.

Applications in sulfuric acid manufacture, ammonia oxidation, gaseous reactions, hydrocarbon reforming, hydrogenation and halogenation. 10 ref. (T29, EG-c)

126-T. (French.) **Development of the Construction of Welded Spiral Housing for Reaction Turbines.** Pierre Piguet. *Zeitschrift für Schweisstechnik,* v. 45, no. 7, July 1955, p. 123-126.

Disadvantages of cast iron and cast steel housing for medium and low-pressure turbines. Combination

of cast steel and steel sheet structural elements welded together make possible the elimination of the above disadvantages. Diagrams, photographs.
(T25, K general, CI, ST)

127-T. (German.) **Use of Light Metals for Construction of Hydroplanes.** E.-Fr. Gebauer. *Aluminium,* v. 31, nos. 7-8, July-Aug. 1955, p. 347-350.

Compares a hydroplane, which uses aluminum extensively, with other current designs. Table, graph, diagram, photographs. 3 ref.
(T22, Al)

128-T. Simplified Magnesium Air-Frame Design. J. P. Donald Garges. *Aeronautical Engineering Review,* v. 14, Aug. 1955, p. 36-43.

Use of thick-skin magnesium design techniques in the fabrication of swept and thin wings and other structural components results in reductions in weight, cost and engineering complexity. Diagrams, photographs, table, graphs. 5 ref.
(T24, Mg)

129-T. An Evaluation of Brass-Powder Structural Parts in Product Engineering. G. L. Werley. *American Society of Mechanical Engineers, Paper No.* 55—S-39, 1955, 6 p. + 4 plates.

Brief review of brass powder metallurgy. Examples, applications, advantages and properties of various parts. Photographs, diagrams, tables. (T, H general, Cu)

130-T. Tool Steels. II. Proper Selection Simplified. B. M. Hamilton. *Canadian Metals,* v. 18, Aug. 1955, p. 52, 54-55.

Water, oil and air hardening steels, and alloys for cold, hot and high-speed operations classified. Tables, photograph. (T6, TS)

131-T. High Permeability Steel Castings. Design and Manufacturing Techniques. J. F. Hinsley. *Edgar Allen News,* v. 34, Aug. 1955, p. 169-173.

Advantages of use of electrical steel castings for high magnetic permeability applications. Design of castings. Table, graphs, diagram, photographs. (T1, P16, E17, CI)

132-T. Manufacture of Cold Formed Structural Sections. *Engineer,* v. 200, Aug. 19, 1955, p. 263-264.

Process of manufacturing structural components for a braced portal structure. Photographs, diagrams. (T26, ST)

133-T. Alloys for the Chemical Process Industries. J. Z. Briggs. *Industrial and Engineering Chemistry,* v. 47, Aug. 1955, p. 1513-1516.

Properties and applications of four main types of alloys that have proved their value in the chemical industry. Graphs. 8 ref. (T29, Mo)

134-T. Today's Tooling Decisions Must Meet Tomorrow's Needs. C. J. Snyder. *Iron Age,* v. 176, Aug. 25, 1955, p. 195-200.

Plymouth's new V-8 engine plant, "bright-as-a-button" by current standards, is designed primarily for future demands. Innovations are detailed. Photographs. (T21, A5, G17)

135-T. Fabrication and Use of Titanium Fasteners. R. K. Smith. *Light Metal Age,* v. 13, Aug. 1955, p. 20-21, 29, 39.

List of ground rules established for design were influenced by test data acquired from sample fasteners. Graphs. (T7, Ti)

136-T. Future Aluminum Uses in Automobile Design. Leo Swoboda. *Light Metal Age,* v. 13, Aug. 1955, p. 24-25, 28.

Through the unique combination of properties, savings in dead weight, availability at a stable price, hybrid-type fabrication, and die casting outlook, use of aluminum in the automotive industry is increasing. Photographs. (T21, Al)

137-T. Better Performance From Metals. J. Harry Jackson. *Paper Mill News,* v. 78, Aug. 27, 1955, p. 72, 74, 76-78.

Problems of corrosion in paper-mill application and the need for good mechanical properties. Table, graphs, micrographs.
(T29, R general, Q general)

138-T. The Present Position of Aluminium in Shipbuilding. II. E. G. West. *Welding and Metal Fabrication,* v. 23, Aug. 1955, p. 299-304, 305-306.

Riveting, welding, types of material, painting and future applications in marine equipment. Photographs, diagrams, tables. 28 ref.
(T22, K1, K13, Al)

139-T. A Review of Ferrous Wire Qualities Appropriate to Chain Making. I. P. L. Lewis. *Wire Industry,* v. 22, Aug. 1955, p. 783-785.

Reviews omissions of the past and emphasizes to the wiremaker the importance to the chain trade of a steady supply of wire uniform in properties and treatment. Describes required analysis and metal-

lographic behavior. Diagram, graph, micrographs, photograph.
(T7, F28, ST)

140-T. (Japanese.) **Selection of Steels for Hot-Formed Springs.** Shigeo Owaku. *Journal of Railway Engineering Research (Japan),* v. 12, no. 9, May 10, 1955, p. 222-224.

Selection of steels for hot formed springs from the standpoint of fatigue strength, shock resistance and heat treatability. Graphs, table.
(T7, AY)

141-T. Selecting Electrodes and Welding Rods. I. Mild and Low-Alloy Steels. Helmut Thielsch. *Machine Design,* v. 27, Sept. 1955, p. 187-193.

Specification of electrodes and their application to specific problems; effect of electrode coatings. Tables, photographs, radiograph. 6 ref. (T5, K1, AY)

142-T. Now Economically Feasible for Many Applications: Zirconium. *Magnesium,* 1955, Aug., p. 10-14.

Corrosion resistance, behavior in fabrication and applications. Photographs. (T general, R general, Zr)

143-T. Preview of Progress in the Use of Inco Nickel Alloy Helical Springs. I. *Mainspring,* v. 16, Aug. 1955, p. 3-9.

Compositions, mechanical properties, corrosion resistance; high-temperature properties. Graphs, tables.
(T7, Ni)

144-T. Aluminium Bronze Alloys. N. C. Ashton and C. V. Wilson. *Metal Industry,* v. 87, Aug. 19, 1955, p. 145-146, 149; Aug. 26, 1955, p. 165-168.

Development of aluminum bronzes for deep-drawing dies. Photographs, tables. 15 ref. (T5, Cu)

145-T. Aluminum vs. Copper Cable —The Case for Aluminum. Ray L. Townsend. *Welding Engineer,* v. 40, Sept. 1955, p. 21-23.

Sufficient conductivity, high heat-dissipating qualities and lightness coupled with decreased cost in comparison to copper definitely point the way for its expanded use. Photograph, tables. (T1, T5, Al, Cu)

146-T. (English.) **Steels Used in Moulds for Plastics.** *Aciers Fins & Spéciaux Francais,* 1955, no. 20, July, p. 32-34.

Problems involved in the selection of steels to be used in the manufacture of molds for plastics.
(T29, ST)

147-T. (English.) **Bi-Metal Strips.** *Aciers Fins & Spéciaux Francais,* 1955, no. 20, July, p. 68-71.

Definition and characteristics, use, applications and stability of these strips. Diagram, table.
(T1, T27, T5)

148-T. (German.) **Problems of Reactor Materials.** K. Lintner and E. Schmid. *Elektrotechnik und Maschinenbau,* v. 72, nos. 15-16, Aug. 1, 1955, p. 334-344.

Types and properties of materials used for fuels, moderators and coolants in atomic power plants and of structural materials for different power plant designs. Diagrams, tables, graphs. 22 ref. (T25)

149-T. (German.) **Silver as a Material Used in Electrical Engineering.** A. Keil and C. L. Meyer. *Schweizer Archiv für angewandte Wissenschaften Technik,* v. 21, no. 8, Aug. 1955, p. 264-270.

Contact breakers and other electrical parts of silver, silver alloys and silver-plated copper wire; condensers of metallized ceramic materials; hard silver solders for different soldering purposes; fuses of silver and silver-plated copper wire; resistors of silver-manganese and silver-palladium alloys. Tables, micrographs, graphs. 15 ref.
(T1, T5, Ag)

150-T. (Russian.) **Aluminum Alloys in Automotive Construction.** L. A. Egorov and A. I. Ermolaev. *Avtomobil'naia i traktornaia promyshlennost',* 1955, no. 7, July, p. 25-27.

Composition and properties of aluminum alloys used in different sections of automotive industry. Photographs, diagrams. 7 ref. (T21, Al)

151-T. (Book.) **Materials for Nuclear Power Reactors.** Henry H. Hausner and Stanley B. Roboff. Reinhold Pilot Book No. 7. 224 p. 1955. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

Properties, problems, and applications of metals and other materials for structural components, fuels, coolants, and moderators.
(T25)

152-T. Aluminum Die Castings for Carrier Telephone Systems. Ludwig Pedersen. *Communication and Electronics.* 1955, no. 20, Sept., p. 434-439.

Die casting, termed the shortest distance between raw material and finished product, provides low-cost equipment. Photographs. 2 ref.
(T1, Al)

153-T. A Discussion of Economic Factors Affecting the Steel Selection

and Heat Treatment for Automotive Gears. Vernon E. Hense and Donald P. Buswell. *General Motors Engineering Journal,* v. 2, Sept.-Oct. 1955, p. 2-10.

Gear design, specific application and required quality level as well as cost, availability, machinability, heat treating characteristics and performance and uniformity properties govern steel selection. Heat treating depends on cost and overall effect on gear's subsequent processing. Photographs, tables, micrographs. (T7, T21, ST)

154-T. Why Bearings Seize. Arvid E. Roach and Carl L. Goodzeit. *General Motors Engineering Journal,* v. 2, Sept.-Oct. 1955, p. 25-29.

Experiments have confirmed a new bearing metal theory which clarifies and unifies the empirical data about bearing materials, and provides a useful basis for selection of new materials. Tables, graphs, photographs. (T7, Q9, SG-c)

155-T. Aluminum Alloys. Harry W. Fritts and Ralph L. Horst, Jr. *Industrial and Engineering Chemistry,* v. 47, Sept. 1955, pt. 2, p. 1946-1952.

Advantages of use in industrial applications. Photographs. 71 ref. (T general, Al)

156-T. Tin and Its Alloys. Robert J. Nekervis. *Industrial and Engineering Chemistry,* v. 47, Sept. 1955, pt. 2, p. 2036-2040.

Review of developments of major interest with emphasis on tin alloy coatings. Photographs. 125 ref. (T general, L general, Sn)

157-T. High Temperature Thermocouple. R. C. Jewell, E. G. Knowles and T. Land. *Metal Industry,* v. 87, Sept. 9, 1955, p. 217-221.

Results of exploring platinum-rhodium system of alloys beyond 13% rhodium. Diagram, photograph, micrographs, table. 11 ref. (T8, M24, Pt, Rh)

158-T. The Selection of Material for Press Forming Dies. *Metal Progress,* v. 68, Aug. 15, 1955, p. 12-20.

Operations involve bending and mild or moderate stretching of the sheet. Selection of die material is based on the previous performance of similar tools from 504 specific sets of conditions. Tables, diagrams. (T5, G1, TS, Zn)

159-T. The Trend to Light Metals in Materials Handling Equipment. E. A. Farrell. *Modern Metals,* v. 11, Sept. 1955, p. 40 + 4 pages.

Since materials handling accounts for 30 to 85% of finished goods cost, economy there can be significant. Aluminum and magnesium are preferred. Photographs. (T5, Al, Mg)

160-T. (Czech.) **Zinc-Alloy Dies.** J. Luboinski and W. Szczepinski. *Strojirenska vyroba,* v. 3, no. 5, May 1955, p. 195-197.

Service life and economics of cutting and punching zinc alloy dies compared with those of other materials; strength, hardness and wear. Diagrams, photograph. (T5, Zn)

161-T. (German.) **Economies Obtainable in Using Aluminum for Commercial Vehicles.** E. Litz and H. Croseck. *Aluminium,* v. 31, no. 9, Sept. 1955, p. 409-413.

Ratio of payload to deadload reveals clearly the fundamental advantage of aluminum vehicles; despite higher capital costs an aluminum vehicle very quickly pays for itself. Tables, photographs, graphs. (T21, Al)

162-T. (German.) **Aluminum in the Construction of Trucks.** H. Suppus. *Aluminium,* v. 31, no. 9, Sept. 1955, p. 414-418.

Chassis girders, floors, sides and tarpaulin supports for open-structure trucks. Diagrams, photographs. (T21, Al)

163-T. (German.) **Wheels, Brakes, and Aluminum.** H. Suppus. *Aluminium,* v. 31, no. 9, Sept. 1955, p. 419-422.

Interaction between ratio of spring-mounted main mass of car to the tire-supported suspension and position of car on road. Diagrams. (T21, Al)

164-T. (German.) **Present Extent of Use of Aluminum for Commercial Vehicles in Europe.** P. Krekel. *Aluminium,* v. 31, no. 9, Sept. 1955, p. 423-432.

Swiss, British, French and Italian designs. Photographs, diagrams. (T21, Al)

165-T. (German.) **Uses of Permanent Magnets in Fields Other Than Electrical Engineering.** H. Fahlenbrach. *Technische Mitteilungen Krupp,* v. 13, no. 4, Aug. 1955, p. 107-108.

Use of permanent magnets in magnetic separators, filters, dampers, brakes and collectors. Diagrams, photograph. (T5, T general, SG-n)

166-T. (German.) **The Sintered Metal Filters and Their Structure, Properties, and Application.** F. Frehn, W. Hotop and G. Stempel. *Werkstoffe und Korrosion,* v. 6, nos. 8-9, Aug.-Sept. 1955, p. 385-389.

Pressure drop, chemical resist-

ance and mechanical and physical properties. Diagrams, photographs, graphs, table. 2 ref. (T29)

167-T. (Russian.) **Electrodes for Welding Austenitic Steels Intended for Long Operation at High Temperatures.** L. G. Petrov and V. V. Kyrchenov. *Svarochnoe proizvodstvo,* 1955, no. 8, Aug., p. 9-13.

Chemical compositions, microstructure and mechanical characteristics of welded-on metal in original state and after aging; welding conditions for obtaining a stable crystalline structure. Tables, graphs, micrographs, structural diagram, diagrams. 5 ref. (T5, K1, M26, ST)

168-T. Experimental High-Temperature Materials for Gas Turbines. A. R. Edwards. *Australasian Engineer,* 1955, July, p. 50-55.

Applications for sintered oxides and carbides (nonmetallic), cermets, molybdenum and chromium alloys in specific locations. Graphs. 17 ref. (T25, SGh)

169-T. Titanium Alloys for Aircraft. H. V. Kinsey. *Canadian Aeronautical Journal,* v. 1, no. 4, Sept. 1955, p. 104-108.

Considers commercially available alloys, forging, forming, welding and machining. Tables, diagrams. 21 ref. (T24, Ti)

170-T. The Metallurgy of Reactor Fuels. J. P. Howe. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/825, July 1955, 46 p.

Applications, requirements and limitations of distinct types of elements; materials and methods used in manufacture; physical and chemical metallurgy of uranium, thorium, zirconium and others. Tables, diagrams, graphs, photographs. 33 ref. (T25, U, Th, Zr)

171-T. Answers to 10 Questions Help You Pick the Right Steel. J. J. Hauptly. *Materials & Methods,* v. 42, Sept. 1955, p. 86-93.

Method for selecting the proper steel for most applications. Various commercial steels arranged in groups according to properties and fabrication characteristics. Tables, photographs. (T general, ST)

172-T. Fluorocarbon + Porous Bronze + Steel Backing = New Dry Bearing Material. *Materials & Methods,* v. 42, Sept. 1955, p. 94-95.

Excellent friction, chemical and wear properties of polytetrafluoroethylene are combined with strength, thermal conductivity and dimensional stability of metals by impregnating porous metal matrix with resin. Photographs, table (T7, SG-c)

173-T. Special Uses Call for Tailor-Made Steels. A. M. Hall. *Materials & Methods,* v. 42, Oct. 1955, p. 92-99.

New steels and modifications of existing ones are in demand to meet requirements of today's applications. Photographs. (T general, AY)

174-T. Which Alloys for Jet Hot Spots? S. G. Demirjian. *Materials & Methods,* v. 42, Oct. 1955, p. 116-118.

Consideration of compression, combustion, nozzle, turbine, and tailcone area of jet engines. Photographs, graph, micrograph, table. (T24, T25, SG-h)

175-T. The Selection and Application of Stainless Steel in the Chemical Process Industries. *Metal Progress,* v. 68, Aug. 15, 1955, p. 37-49.

Stainless steel is subject to general and intergranular corrosion, stress-corrosion cracking, and pitting. Types of attack and the effects of selected reagents. Tables, photographs, graphs. (T29, R6, R7, SS)

176-T. Helical Steel Springs. *Metal Progress,* v. 68, Aug. 15, 1955, p. 76-81.

Deals with extension and compression springs, both cold and hot wound. Proper selection of spring steel wire and the principle considerations of design. Diagrams, graphs, tables. (T7, ST)

177-T. Metallurgy in Nuclear Energy. D. W. Lillie. *Metal Progress,* v. 68, Sept. 1955, p. 82-84.

Elucidation of uranium metallurgy leads the list of spectacular metallurgical achievements in the nuclear energy field, others have to do with zirconium, beryllium, graphite and other fuel materials, and the problems arising from radiation damage. (T25, U, Zn, Be)

178-T. Properties and Characteristics of a Quenched and Tempered Steel for Pressure Vessels. W. D'Orville Doty. *Welding Journal,* v. 34, Sept. 1955, p. 425S-441S.

Notch toughness, metallurgical, welding, and gas cutting characteristics, and tensile and fatigue properties tested. Tables, graphs, micrographs, diagrams. 9 ref. (T26, ST)

179-T. Design of Welded Pressure Vessels Using Quenched and Tempered Steel. L. P. Zick. *Welding Journal,* v. 34, Sept. 1955, p. 442S-448S.

Covers allowable working stresses, design of appurtenances, welding affects on design, and use of material. Diagrams, tables, photographs. 11 ref. (T26, K general, ST)

180-T. Suitability of Quenched and Tempered Steels for Pressure Vessel Construction. Leon C. Bibber. *Welding Journal,* v. 34, Sept. 1955, p. 449S-464S.

Required ductility, elastic ratios, relationship between ductility and toughness and necessity for stress relieving. Results of destructive tests of eight full-scale pressure vessels. Diagrams, tables, photographs, graphs. 8 ref. (T26, ST)

181-T. (German.) **Nonferrous Metals in Electrical Engineering. II. Economic Survey Development in Open-Air Lines.** A. Schwarz. *Metall,* v. 9, nos. 17-18, Sept. 1955, p. 753-757.

Problems of utilization of different metals as open-air conductors, and protection of line and masts by coatings. Tables, graphs, diagrams, photograph. 24 ref. (T1, Al, Cu, Pb)

182-T. (Pamphlet.) **Aluminium in Ships' Structures. A Review of Current Practice.** L. M. C. Robinson. 31 p. 1954. Aluminium Development Association, 33 Grosvenor St., London.

Concerned with materials, their joining and construction. (T22, Al)

183-T. Applications of Indium Antimonide. I. M. Ross and E. W. Saker. *Journal of Electronics,* v. 1, ser. 1, Sept. 1955, p. 223-230.

Applications as radiation detector, filter material or thermoelectric generator in electronic and radiation equipment. Graph, diagrams. 16 ref. (T1, In, Sb)

184-T. High Nitrogen Cast Austenitic Steels. John F. Carlson and Victor F. Zackay. *Journal of Metals,* v. 7; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Oct. 1955, p. 1112-1113.

Gas turbine engines in automobile industry need low-cost nonstrategic alloy for service between 1200 and 1400° F. Graphs. (T21, SS)

185-T. Review of Ferrous Wire Qualities Appropriate to Chain Making. II. P. L. Lewis. *Wire Industry,* v. 22, Sept. 1955, p. 873 + 5 pages.

Covers carbide precipitation, strain-age embrittlement, grain size, annealing, chemical analysis, importance of fully killing steel, causes of faulty wire chain, intercrystalline carbide films, faulty welds, surface condition, various steel chains. Photographs, graph, micrographs, diagrams. 10 ref. (T7, ST)

186-T. Design and Construction of Transformers for the Steel Industry. W. Walter Renberg. *Iron and Steel Engineer,* v. 32, Oct. 1955, p. 66-75.

Attempts to obtain desirable features of low losses, low temperature rise, large safety factors and machanical stability are possible only at the expense of size, weight and cost. Photographs, diagrams, table. 6 ref. (T1, ST)

187-T. Aluminum in Fractional Horsepower Motors. D. J. Harbour. *Modern Metals,* v. 11, Oct. 1955, p. 60, 62.

Discusses magnet wire, wire connectors, redesign and combining copper and aluminum wires. Photographs, table. (T25, Cu, Al)

188-T. The Modern Galvanized Sheet and Its Uses. Francis H. Smith. *Sheet Metal Industries,* v. 32, no. 342, Oct. 1955, p. 735-740, 744.

Sheet produced by modern continuous process, with details of its fabrication into finished parts. Illustrates its adaptability by reference to its high-grade finish and workability. Photographs, diagram, table, micrographs.
(T general, L16, ST, Zn)

189-T. High-Strength Steels for Aircraft Structures. Edward A. Loria. *Western Machinery and Steel World,* v. 46, Oct. 1955, p. 72-76.

Steels must withstand the higher operating temperatures of power plants and kinetic heating of air at supersonic speeds. Tables, graphs. 6 ref. (T24, AY)

190-T. Functions of Reactor Materials. E. M. Simons. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 1-8.

Metallurgical requirements of materials for fuel and structural elements, control, moderation, reflection, shielding. Table. (T25)

191-T. (English.) **Aluminum Applications in the Alcoa Building.** William T. Ennor. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 239-246.

Describes outside walls, partitions, windows, air conditioning, heating by radiation, plumbing, electrical circuits and architectural design. Photographs, micrograph. 10 ref. (T26, Al)

192-T. (English.) **Aluminium Cans for Processed Food Products.** A. V. Lovell. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 273-292; disc., p. 292.

Shows results of canning vegeta-

bles and fruit using deep cans, lacquered after drawing. Photographs, tables, diagrams, graphs. (T29, Al)

193-T. (English.) **Why Aluminum Is Used in Its Major Applications in the United States.** George Perkins. Paper from "Congres International de l'Aluminium". V. II. La Société d'Edition et de Documentation des Alliages Légers, p. 315-322; disc., p. 322-323.

Reasons for growth of use include characteristics of metal and its alloys, namely, lightness, electrical and thermal conductivity, good corrosion resistance, lack of toxicity, malleability, reflectivity, high tensile strength and castability. (T general, Q general, Al)

194-T. (French.) **Transposition of Materials and Construction Scales in the Fabrication of Large Structures.** Raymond de Fleury. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 207-216.

Transposition of dimensions depends on properties of light metal to be used. Graphs. 6 ref. (T26, EG-a)

195-T. (French.) **Aluminum in Italian Naval Rebuilding.** Richard Struss. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 255-264; disc., p. 264.

Since end of second world war, more important merchant ships built or rebuilt contain up to 200 tons of light alloys, especially aluminum-magnesium. Tables, photographs, diagram. (T22, EG-a, Al, Mg)

196-T. (French.) **Trends in the Use of Aluminum for Packaging in Italy.** Eugenio Hugony. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 265-272; disc., p. 272.

Uses include foil, collapsible tubes, milk cans with internal cladding, mastic sealed tubes and foil laminated with polyethylene. Photographs, micrograph, tables. (T10, Al)

197-T. New Super Alloy Speeds Jet Progress. R. W. Guard and T. A. Prater. *Iron Age,* v. 176, Oct. 20, 1955, p. 116-118.

Jetalloy 1570, for aircraft gas turbine buckets, has good forgeability and superior fatigue strength at 1500° F. Tables, photographs, graphs. (T24, F22, Q7, SG-h)

198-T. Quality Control in the Production of Aluminum Foil. O. H. Bishop. *Light Metal Age,* v. 13, Oct. 1955, p. 14-17, 33, 38.

Considers household foil because it encompasses general pattern of operations and is convenient for sampling. Photographs, graph. 5 ref. (T10, S12, Al)

199-T. The Outlook for Light Metals Use. Douglas Watson and Jack L. Davies. *Light Metal Age,* v. 13, Oct. 1955, p. 24-26, 39.

Emphasis on applications of aluminum and magnesium. Photographs. (T general, EG-a, Al, Mg)

200-T. Development of a Welded Aluminum Bus for Substations. C. E. Asbury and C. J. Hartman. *Power Apparatus and Systems,* 1955, no. 20, Oct., p. 834-838; disc., p. 838-839.

Provides appreciable saving in material and in installation labor for major stations. Diagrams, photographs. 6 ref. (T1, Al)

201-T. Aluminum Widely Used in Power Switchgear. J. L. Talento. *Power Apparatus and Systems,* 1955, no. 20, Oct., p. 839-843; disc., p. 843-844.

Applications vary from small rivets and hardware to important structural and current carrying parts. Photographs, tables. 1 ref. (T1, Al)

202-T. The Use of All-Aluminum Conductor on Transmission Lines. E. M. Wright and E. G. Lambert. *Power Apparatus and Systems,* 1955, no. 20, Oct., p. 849-853; disc., p. 853-854.

Economic advantages over other types of conductors. Graphs, tables, diagram. (T1, Al)

203-T. Chrome Carbide for Hot Extrusion of Brass and Copper. A. Earle Glen. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1230-1231, 1294.

Chemical composition, physical properties, microstructure, advantages of using. Photographs, diagrams. (T5, G5, Cu, C, Cr)

204-T. Mineral-Insulated Metallic-Sheathed Cables. G. S. Eager, Jr., and S. P. Lamberton. *Wire and Wire Products,* v. 30, Oct. 1955, p. 1240 + 6 pages.

This 600-volt cable is composed of copper, for conductors and seamless outer sheath, and compressed magnesium oxide for insulation. Tables, graphs. 2 ref. (T1, Mg, Cu)

205-T. Aluminum and Its Alloys. N. F. Ritchey and C. M. Craighead. Paper from "Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 9-40.

Because of its low thermal neutron absorption cross section and corrosion resistance, aluminum warrants favorable consideration as a

structural material and as a protective coating for fuel elements. Its low melting point, decreased high-temperature strength, and lowered corrosion resistance of most of the higher strength alloys limit its use to low-temperature applications. Tables, graphs. (T26, Al)

206-T. (English.) **Experience of the Application of Aluminum for Structural Purposes.** W. D. Devereux, J. M. Smith and E. J. Pike. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 199-205; disc., p. 205.

Principles by which British engineers have been guided in the design of light alloy sections used for framework and structures of buildings having very large bays. Photographs. (T26, Al)

207-T. (Czech.) **Unalloyed Compound Cast Iron Rolls for Rolling Mills.** Otto Necas and Vojtech Krhut. *Slévarenstvi,* v. 3, no. 9, Sept. 1955, p. 260-265.

Production of cast iron rolls without the use of charcoal pig iron. Production of rolls by interrupted pouring is more convenient than by continuous pouring. Photographs, diagrams, micrographs. 10 ref. (T5, E23, CI)

208-T. (French.) **Lightening of Metallic Construction.** A. Ogus. *Métallurgie et la construction mécanique,* v. 87, no. 9, Sept. 1955, p. 693, 695, 697, 699.

Examines question of quality of metal, use of folded pieces, light alloys and welded and riveted construction, from the point of view of having a lighter metallic construction. Diagram, graphs. (T26, Al)

209-T. (French.) **Achievements and Trends in the Use of Light Alloys for Architecture.** Romolo Donatelli. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 231-328; disc., p. 238.

Recalls light alloy characteristics of interest in architecture. Photographs, diagrams, table. (T26, Al, EG-a)

210-T. (French.) **Use of Aluminum in the Electrotechnology of Italy.** Arrigo Perrone. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 293-301.

Statistical account of aluminum consumption; characteristics of alloys used. Graphs, photographs, table, diagrams. (T1, Al)

211-T. (French.) **Light Metal Bearings and Their Uses.** Alfred Buske. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 305-314.

Advantages include high thermal conductivity and low modulus of elasticity. Discusses housings and lamination for different purposes. Photographs, micrographs, graphs, diagrams, table. (T7, Al, SG-c)

212-T. (Book.) **Chemical Processing and Equipment.** 302 p. U. S. Atomic Energy Program, U. S. Government Printing Office, Superintendent of Documents, Washington 25, D. C. $2.00.

Study of work on reactor fuel elements at the Idaho Chemical Processing Plant. (T25, T29, EG-h)

213-T. (Book.) **Magnetic Materials in the Electrical Industry.** P. R. Bardell. 288 p. 1955. Philosophical Library, 15 East 40th Street, New York 16, N. Y. $10.00

Considers theories, permanent magnet materials, properties of soft materials, recording, testing of materials, transductors, and transducers. (T1, SG-n, p)

214-T. (Book.) **The Reactor Handbook.** J. F. Hogerton and R. C. Grass, editors. **v. III. Materials.** AECD-3647. 610 p. 1955. Technical Information Service, U. S. Atomic Energy Commission. Available from U. S. Government Printing Office, Superintendent of Documents, Washington, D. C. $3.50.

Functions of reactor materials and the properties of some metals and their alloys, the rare earths, high-cross-section materials, cements, concretes, stainless steels, and other significant materials. (T25)

215-T. (Book.) **Steel Designers' Manual.** Charles Gray, Lewis E. Kent, W. A. Mitchell, and G. Bernard Godfrey. 909 p. 1955. Crosby Lockwood and Son Ltd., 26 Old Brompton Road, London SW7, England.

Preparation of present-day knowledge on design of steel framed buildings, and presentation of complete data, tables, and diagrams for use by the practicing designer. (T26, ST)

SECTION V

MATERIALS—

General Coverage of Specific Materials

1-V. (Dutch.) **Copper and Copper Alloys. XIV. Special Brass.** W. G. R. de Jager. *Metalen,* v. 9, no. 19, Oct. 15, 1954, p. 310-313.

Tables of dimensions and mechanical properties of the commercially available types of brass products. 14 ref. (To be continued.) (S22, Cu)

2-V. (German.) **High-Melting Metals and Their Alloys as Raw Materials for the Construction of Apparatus.** F. Benesovsky and K. Sedlatschek. *Chemie-Ingenieur-Technik,* v. 26, no. 10, Oct. 1954, p. 538-543.

Production, processing and behavior toward all types of corrosion and specific fields of applications. Tables. 14 ref. (T general, Ti, Zr, Hf, Ta, Nb, V, Cr, Mo, W)

3-V. (German.) **Titanium.** A. von Zeerleder, A. Koller and E. Koelliker. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 20, no. 9, Sept. 1954, p. 273-290.

Literature review on the history, sources, production, metallurgy and properties of titanium and its alloys; survey of present status and future prospects of titanium. Tables, charts, photograph, diagrams, graphs. 55 ref. (Ti)

4-V. (German.) **Hardenable Copper Alloys.** Rudolph Reinbach. *Zeitschrift für Erzbergbau und Metallhüttenwesen,* v. 7, no. 10, Oct. 1954, p. 441-446.

Importance of the hardenable alloys; the principle of the hardening process; heat treating for hardness; and properties and uses of hardenable Cu-Be, Cu-Cr, Cu-Mn-Ni and Cu-Ni-Si alloys. Graphs, micrographs, table, photographs. 6 ref. (Si, Cu, Be, Cr, Mn, Ni)

5-V. **New Metals for Nuclear Technology.** William A. Johnson. *American Society of Naval Engineers, Journal,* v. 66, Nov. 1954, p. 887-896.

Brief review of properties and applications of beryllium, zirconium, and uranium. (T25, Be, Zn, U)

6-V. **High-Strength Weldable Steel.** W. E. Bardgett and L. Reeve. *Iron & Steel,* v. 27, Nov. 1954, p. 514-518.

Mechanical properties, machinability, corrosion resistance and applications. Tables, graphs, diagram, photographs. 3 ref. (AY)

7-V. **Rare-Earths in Metallurgy.** H. Evans. *Metal Industry,* v. 85, Oct. 29, 1954, p. 365-367, 374.

Occurrence, extraction and applications, effects of additions to various alloys. Tables, graphs, micrographs. 10 ref. (EG-g)

8-V. **Titanium in Jet Engines.** D. C. Goldberg. *Modern Metals,* v. 10, Nov. 1954, p. 46, 48, 50, 52.

Production, alloy systems, fabrication problems, mechanical properties and required research. Diagram, photographs, tables, graph. (T25, Ti)

9-V. **Recent Developments in Cast Iron.** S. B. Bailey. *Times Science Review,* 1954, Winter, p. 6, 8.

Development, properties and applications of gray, malleable and nodular cast irons. Photographs. (CI)

10-V. (German.) **Production of Titanium and Its Application.** Joachim Hedderich. *Metallurgie und Giessereitechnik,* v. 4, no. 9, Sept. 1954, p. 389-394.

Review of literature on production methods, properties, and uses of titanium and its alloys. Diagrams, tables, graph. 36 ref. (Ti)

11-V. **Naval Brass. Corrosion Resistant Brass.** *Alloy Digest,* no. Cu-21, Dec. 1954.

Composition, physical constants, mechanical properties, machinability and weldability. (Cu)

12-V. **Elektron-MCZ. Creep Resistant Magnesium Casting Alloy.** *Alloy Digest,* no. Mg-14, Dec. 1954.

Composition, physical constants, mechanical properties, machinability, joining, corrosion resistance and surface treatment. (Mg)

13-V. K-42-B. Precipitation Hardening Heat Resistant Alloy. *Alloy Digest,* no. Ni-13, Dec. 1954.
Composition, physical constants, mechanical properties, heat treatment, machinability and general characteristics. (Ni, Fe, SG-h)

14-V. Hastelloy Alloy X. Heat and Oxidation-Resistant Alloy. *Alloy Digest,* no. Ni-14, Dec. 1954.
Composition, physical and mechanical properties, workability and machinability. (Ni, SS, SG-h)

15-V. Nitralloy 135 Modified. Nitriding Steel. *Alloy Digest,* no. SA-24, Dec. 1954.
Composition, physical constants, mechanical properties, machinability, weldability and corrosion resistance. (AY)

16-V. Duraloy HU. Heat & Corrosion Resistant Steel. *Alloy Digest,* no. SS-21, Dec. 1954.
Composition, physical constants, mechanical properties, heat treatment, machinability, corrosion resistance and general characteristics. (SS, SG-g, SG-h)

17-V. USS 5. Corrosion and Heat Resisting Steel. *Alloy Digest,* no. SS-22, Dec. 1954.
Composition, physical constants, mechanical properties, heat treatment and weldability. (SS, SG-g, h)

18-V. Vulcan Non-Shrinkable. Non-Deforming Tool Steel. *Alloy Digest,* no. TS-28, Dec. 1954.
Composition, mechanical properties, heat treatment and machinability. (TS)

19-V. Modern Trends in Hollow Drill Steel. B. M. Hamilton. *Canadian Mining and Metallurgical Bulletin,* v. 47, no. 511, Nov. 1954, p. 748-755; *Canadian Institute of Mining and Metallurgy, Transactions,* v. 57, 1954, p. 486-493.
Development and properties of alloy toolsteels for making rock drills. Graphs, tables, photographs. (T28, TS)

20-V. Material, Treatment and Design for Drill Rods. T. E. Norman. *Mining Congress Journal,* v. 40, Nov. 1954, p. 31-34, 101.
Mechanical properties, heat and surface treatments, and corrosion fatigue properties of carbon and alloy steels for drill rods. Tables, graphs, photographs, micrographs. (T28, ST)

21-V. Graphitic Tool Steels in the Press Room. Lester F. Spencer. *Tool Engineer,* v. 33, Dec. 1954, p. 97-101.
Structures, properties and advantages for forming tools. Photograph, micrographs, tables, graphs. 4 ref. (T6, T5, TS)

22-V. Nitrogen-Alloyed High Speed Steel. V. I. Prosvirin and I. R. Ushevskii. *Henry Brutcher, Altadena, Calif., Translation no.* 2931, 18 p. (From "Nitrogen in Steel", Azot v Stali, 1950, p. 140-160.)
Study of experimental steels for influence of nitrogen on austenite grain size, quantity of retained austenite, secondary hardness, martensite transformation during tempering and cutting performance. Tables, micrographs, graphs. (M27, Q29, N8, J29, G17, TS)

23-V. (Pamphlet.) **Titanium Bibliography.** Report CTR-306. 26 p. Office of Technical Services, U. S. Department of Commerce, Room 6227, Washington 25, D. C. $0.50.
More than 300 research reports are described and priced. Complete instructions for ordering accompany each entry. Special listings are featured for titanium alloys, titanium carbides, titanium nitrides, and the various titanium oxides. Research covers all characteristics of the metal, mechanical, chemical, and physical. (Ti)

24-V. (Book.) **Handbook on Titanium Metal.** 7th Rev. Ed. 93 p. 1953. Titanium Metals Corp. of America, 233 Broadway, New York 7, N. Y.
Methods of production, physical and mechanical properties, corrosion resistance, fabricating practices. (Ti)

25-V. New Stainless Alloy "Bridges Gap" Between 300 and 400 Series. A. J. Lena. *Iron Age,* v. 174, Dec. 2, 1954, p. 113-116.
New steel is austenitic when annealed but can be hardened by precipitation or by subzero cooling. Tables, graph, photograph. (SS)

26-V. (German.) **Advances in the Metallurgy of Ferrous Materials.** A. Keller. *Chimia (Switzerland),* v. 8, no. 11, Nov. 15, 1954, p. 245-255.
Review of literature on the entire field ranging from ore beneficiation, smelting, refining, and casting. 105 ref. (To be continued) (B14, E10, D9, Fe)

27-V. The Mystery Metal Lithium. A. F. G. Cadenhead. *Canadian Metals,* v. 17, Dec. 1954, p. 18, 20.
Sources, properties, uses and cost. (Li)

28-V. (French.) **Zicral. Comparison of High-Resistance Alloys With Other Light Alloys From the Point of View of Heat Treatment, Shaping, Surface State, Protection, Etc.** R. Lachenaud. *Technique et science aéronautiques*, 1954, no. 4, p. 287-297.

Characteristics and behavior of high-resistance Al-Zn-Mg-Cu alloy with 8% zinc. Graphs, tables, photograph. 5 ref.
(SG-q, Zn, Al, Cu, Mg)

29-V. (Hungarian.) **Manufacturing Conditions and Properties of Modified Cast Iron. II.** Ferenc Varga, Béla Körös, Elek Chapo, Kazmer Janossy and Rezsö Sima. *Ontöde*, v. 5, no. 9, Sept. 1954, p. 193-208.

Extensive investigations to determine data for introduction of the iron. Tables, graphs, micrographs. 15 ref. (CI)

30-V. Aluminum 7001. Heat Treatable Aluminum Alloy. *Alloy Digest*, no. Al-22, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability, weldability and corrosion resistance. (Al)

31-V. Olympic Bronze Type A. Silicon Bronze. *Alloy Digest*, no. Cu-22, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability, weldability, corrosion resistance, and pickling. (Cu)

32-V. Corrosist-D. Corrosion Resisting Alloy. *Alloy Digest*, no. Ni-15, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability, weldability and corrosion resistance. (SG-g, Ni)

33-V. Carilloy T-1. High Strength Structural Steel. *Alloy Digest*, no. SA-25, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability, weldability and corrosion resistance. (AY)

34-V. AISI 6150. Chrome-Vanadium Steel. *Alloy Digest*, no. SA-26, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability and weldability. (AY)

35-V. EME. Heat and Corrosion Resistant Alloy Steel. *Alloy Digest*, no. SS-23, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability, weldability, corrosion resistance and pickling. (SS)

36-V. Worthite. Acid-Resisting Steel Alloy. *Alloy Digest*, no. SS-24, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability, weldability and corrosion resistance. (SS)

37-V. OMEGA. Shock Resistant Tool Steel. *Alloy Digest*, no. TS-29, Jan. 1955.

Composition, physical constants, mechanical properties, heat treatment, machinability and weldability. (TS)

38-V. Materials Engineering File Facts. Cast Aluminum Bronzes. *Materials & Methods*, v. 40, Dec. 1954, p. 135.

Compositions, mechanical, physical and fabricating properties, heat treatment and corrosion resistance. (Cu)

39-V. Aluminum: How it Compares With Other Metals. *Western Machinery and Steel World*, v. 45, Dec. 1954, p. 93-95.

Data to assist in selecting right material for a given product. Tables, photographs. (T general, Al)

40-V. Production and Fabrication of Heat Resistant Alloys From the Producers' Viewpoint. C. T. Evans, Jr. Paper from "Utilization of Heat Resistant Alloys." American Society for Metals, p. 148-183.

Review of existing practices, problems and accomplishments. Photographs, tables, diagrams. 15 ref. (SG-h)

41-V. (Book.) **Utilization of Heat Resistant Alloys.** 288 p. 1954. American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. $6.00.

A symposium consisting of 11 papers covering mechanical properties, acceptance testing, manufacture, design criteria, and applications of high-temperature alloys. Papers are individually abstracted.
(T general, SG-h)

42-V. The Copper Industry in Australia. A. L. Simmons. *Metal Progress*, v. 67, Jan. 1955, p. 87-92.

The dilemma of finding more ore reserves for a metal which is suddenly needed in plenty now confronts the Australian copper industry. The production from new workings, started in recent years to meet the demands of an expanding industrialization, posed a problem for a time because of the industry's inadequate refining capacity; today the problem concerns the rapidly dwindling 12-yr. supply of domestic ores. Fabricating capaci-

ty, comprised of a number of young and technologically modern companies, will soon be adequate to meet foreseeable needs. Map, photographs, table. 4 ref. (A4, B10, Cu)

43-V. A Turbine-Blade Alloy Castable and Low in Cobalt and Columbium. W. Siegfried and F. Eisermann. *Metal Progress,* v. 67, Jan. 1955, p. 141-146.

Work to discover a "superalloy" capable of investment casting (mass production) and economical in scarce alloying metals. Work which indicates that cast turbine blades are no more susceptible to thermal shock than the forged blades successfully used in gas turbines. Diagrams, graphs, photographs, table. (T25, E15, SG-h)

44-V. Aluminum-Base Copper-Cadmium Alloys. E. A. G. Liddiard. *Product Engineering,* v. 26, Jan. 1955, p. 192-196.

Properties and applications for new age-hardening alloys offers increased production rates, lower costs and less critical heat treatment. Photographs, graphs, tables. 8 ref. (Al)

45-V. (Czech.) **Some Properties of Spheroidal Iron Inoculated With Dowmetal.** Zdenek Hostinsky and Cestmir Hlousek. *Slévarenstvi,* v. 2, no. 11; *Prace Ceskoslovenského Vyzkumu Slévarenského,* v. 1, no. 12, Nov. 1954, p. 77-88.

Casting behavior, mechanical properties, corrosion resistance and applications. Diagrams, tables, micrographs, graphs, photographs. 93 ref. (CI)

46-V. (Czech.) **Cold Rolled Steel Sheet.** Augustin Havlik. *Hutnické Listy,* v. 9, no. 11, Nov. 1954, p. 647-650.

Rolling conditions and equipment; heat treatments; mechanical properties; applications; microstructures. Tables, photographs, micrographs. 6 ref. (CN)

47-V. (Dutch.) **Copper and Copper Alloys. XIV. Special Brass.** W. G. R. de Jager. *Metalen,* v. 9, no. 23, Dec. 15, 1954, p. 381-383.

Mechanical, physical and corrosion properties. (Q general, P general, R general, Cu)

48-V. (German.) **Progress in the Metallurgy of Iron.** A. Keller. *Chimia (Switzerland),* v. 8, no. 12, Dec. 1954, p. 271-283.

Processes of heat treatment, surface protection, welding and machining for various types of steels, sintered materials and cast iron; methods of measurement and material testing. 142 ref. (Fe, ST, AY)

49-V. (Polish.) **Economical Bearing Alloy $ZnAl_{10}Cu_5$.** *Hutnik,* v. 21, no. 8, Aug. 1954, *Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa,* v. 5, no. 8, 1954, p. 29-32.

Composition, structures, mechanical properties and applications. Tables, graphs. 2 ref. (Zn)

50-V. (Polish.) **Aluminum Bronzes: Their Manufacture, Properties, and Uses.** Kazimierz Kurski. *Wiadomosci Hutnicze,* v. 10, no. 11, Nov. 1954, p. 314-320.

Effect of alloying additions; corrosion resistance. Diagram, graphs, tables. 7 ref. (Cu)

51-V. Zirconium. Sources, Extraction and Properties. G. L. Miller. *Iron & Steel,* v. 28, Jan. 1955, p. 19-25.

Production, fabricating characteristics, corrosion behavior, mechanical properties and physical constants. Tables, diagrams, graph. 32 ref. (Zr)

52-V. New Tough High Strength Steel Cuts Fabrication Cost. John B. Campbell. *Materials & Methods,* v. 41, Jan. 1955, p. 102-106.

Composition, properties and applications. Photographs, tables, graphs. (AY)

53-V. Wrought Non-Leaded Brasses. John L. Everhart. *Materials & Methods,* v. 41, Jan. 1955, p. 111-126.

Compositions, properties, applications. Photographs, tables. (Cu, Zn)

54-V. Characteristics of Magnesium Alloys. *Materials & Methods,* v. 41, Jan. 1955, p. 131, 133.

Table of compositions and characteristics. (Mg)

55-V. (German.) **Systematology of the Cast Iron Group of Materials.** Adalbert Wittmoser. *Giesserei,* v. 41, no. 26, Dec. 23, 1954, p. 685-692.

Review of iron-carbon alloys exceeding 1.7% carbon; development of malleable and gray iron; definition of terms. Micrographs, graphs, diagrams. 80 ref. (CI)

56-V. Rare Metal Series: Beryllium. A. F. G. Cadenhead. *Canadian Metals,* v. 18, Jan. 1955, p. 18-19.

History, occurrence, and supply in the U. S. (Be)

57-V. Physical and Mechanical Properties of Rhenium. Chester T. Sims, Charles M. Craighead and Robert I. Jaffee. *Journal of Metals,* v. 7, Jan. 1955; *American Institute of Mining and Metallurgical Engineers, Transactions,* v. 203, Jan. 1955, p. 168-179.

Fabrication by powder metallurgy; physical and mechanical properties; oxidation resistance. Tables, micrographs, photographs, diagram, graphs. 17 ref. (H general, P general, Q general, R2, Re)

58-V. Rules for Cutting, Forming, Cleaning and Heat-Treating Titanium Sheet Metal. *Metal-Working,* v. 11, Feb. 1955, p. 16-17.

Typical mechanical properties; characteristics of various classes of titanium alloys. Tables, diagrams. (Ti)

59-V. Aluminum 2024. Heat Treatable Wrought Aluminum Alloy. *Alloy Digest,* no. Al-23, Feb. 1955.

Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, corrosion resistance and general characteristics. (Al)

60-V. Ampco Metal—8. Aluminum Bronze. *Alloy Digest,* no. Cu-23, Feb. 1955.

Composition, physical and mechanical properties, machinability, workability, weldability, corrosion resistance and general characteristics. (Cu, Al)

61-V. Dowmetal G. Heat Treatable Magnesium Casting Alloy. *Alloy Digest,* no. Mg-15, Feb. 1955.

Composition, physical and mechanical properties, heat treatment, machinability, weldability, corrosion resistance and general characteristics. (Mg, Al)

62-V. "S" Monel. Nickel Casting Alloy. *Alloy Digest,* no. Ni-16, Feb. 1955.

Composition, physical and mechanical properties, heat treatment, welding, machinability, corrosion resistance and general characteristics. (Ni, Cu)

63-V. Carpenter No. 5-317. Nickel-Chromium Steel. *Alloy Digest,* no. SA-27, Feb. 1955.

Composition, physical and mechanical properties, heat treatment, machinability, weldability and general characteristics. (AY)

64-V. Enduro HC. Heat and Corrosion Resisting Steel. *Alloy Digest,* no. SS-25, Feb. 1955.

Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, corrosion resistance and general characteristics. (SS)

65-V. Jessop G.18B. Heat Resisting Alloy. *Alloy Digest,* no. SS-26, Feb. 1955.

Composition, physical and mechanical properties, heat treatment, machinability, weldability, corrosion resistance and general characteristics. (SS)

66-V. Vasco Supreme A. High Speed Steels. *Alloy Digest,* no. TS-30, Feb. 1955.

Composition, mechanical properties, heat treatment, machinability, workability and general characteristics. (TS)

67-V. Vanadium. A. F. G. Cadenhead. *Canadian Metals,* v. 18, Feb. 1955, p. 22, 24.

Occurrence, production, properties. (V)

68-V. A Forgeable High-Temperature Chromium-Iron Alloy. (Digest of "The Development of a Forgeable High-Strength, High-Temperature, Chromium-Rich, Chromium-Iron Alloy," by D. P. Moon, H. A. Blank and A. M. Hall; WADC Technical Report 53-451, Jan, 1954.) *Metal Progress,* v. 67, Feb. 1955, p. 138, 140, 142.

Composition, properties and working characteristics of alloy containing not over 2% of critical metals. (SG-h, Fe, Cr)

69-V. Copper and Copper Alloys. A Survey of Technical Progress During 1954. E. Voce. *Metallurgia,* v. 51, no. 303, Jan. 1955, p. 9-16.

Developments in raw materials, extraction, fabrication, finishing and properties. 167 ref. (Cu)

70-V. Recent Progress in Alloy and Special Steels. G. T. Harris and E. Johnson. *Metallurgia,* v. 51, no. 303, Jan. 1955, p. 17-23.

Developments in alloy and special steels. Tables, photographs. 36 ref. (AY, ST)

71-V. Carbon—a Neglected Metallurgical Tool? Carl E. Swartz. *Metal Progress,* v. 67, Feb. 1955, p. 77-81.

As a material of construction, carbon has long been neglected. Few metallurgists realize its possible applications in their work, and fewer still have had any experience with it. Nevertheless, in the foundry, in the steel mill, in nuclear reactor technology and in various other metallurgical operations, it has many properties which make it a useful and economical material. Photographs. (C)

72-V. Water Hardening Tool Steels. George A. Roberts. *Tool Engineer,* v. 34. Feb. 1955, p. 87-90.

Reasons for large number of grades of plain carbon of carbon-vanadium steels. Photographs, tables. (ST)

73-V. Thermenol—A Non-Strategic Aluminum-Iron Base Alloy for High Temperature Service. U. S. Naval Ordnance Laboratory. *U. S. Department of Commerce, Office of Technical Services,* PB111530, 1954, 18 p. $0.50.
New alloy with 16% aluminum and 3% molybdenum resists oxidation at temperatures up to 2300° F., is 20% lighter than stainless steel, and has good stress-rupture life. Photographs, tables.
(R2, Q4, SG-h, Fe, Al, Mo)

74-V. (Dutch.) **Copper and Copper Alloys. XIV. Special Brass.** W. G. R. de Jager. *Metalen,* v. 10, no. 1, Jan. 15, 1955, p. 8-10.
Composition, structure, and physical properties. Tables. (Cu)

75-V. (Russian.) **Strength of Nodular Graphite Cast Iron.** I. V. Kudriavtsev and N. B. Baranova. *Liteinoe Proizvodstvo,* 1954, no. 9, Dec., p. 6-10.
Composition, mechanical properties and conditions of heat treatment. Tables, graphs. (CI)

76-V. BA.46. Aluminum Casting Alloy. *Alloy Digest,* no. Al-24, Mar. 1955.
Composition, physical constants, mechanical properties, heat treatment, machinability, weldability, corrosion resistance and general characteristics. (Al)

77-V. Herculoy 420. Silicon Bronze. *Alloy Digest,* no. Cu-24, Mar. 1955.
Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, corrosion resistance, pickling and general characteristics.
(Cu, Si)

78-V. Rodar. A Metal-to-Glass Sealing Alloy. *Alloy Digest,* no. Fe-6, Mar. 1955.
Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, pickling and general characteristics. (K11, Fe, Ni, Co)

79-V. Electron ZWl. Magnesium Wrought Alloy. *Alloy Digest,* no. Mg-16, Mar. 1955.
Composition, physical and mechanical properties, machinability, workability, weldability, corrosion resistance, surface treatment and general characteristics. (Mg)

80-V. "K" Monel. Corrosion Resistant Nickel-Base Alloy. *Alloy Digest,* no. Ni-17, Mar. 1955.
Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, corrosion resistance and general characteristics. (Ni)

81-V. Sicromo 7. High Temperature, Corrosion Resistant Alloy Steel. *Alloy Digest,* no. SA-28, Mar. 1955.
Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, corrosion resistance and general characteristics. (SG-g, h, AY)

82-V. Cyclops 17B. Corrosion & Heat Resisting Alloy Steel. *Alloy Digest,* no. SS-27, Mar. 1955.
Composition, physical and mechanical properties, heat treatment, machinability, workability, weldability, corrosion and heat resistance and general characteristics. (SS)

83-V. Ultimo-6. Hot Work Tool Steel. *Alloy Digest,* no. TS-31, Mar. 1955.
Composition, mechanical properties, heat treatment, machinability, workability, weldability and general characteristics. (TS)

84-V. Nak, a Versatile Alloy. *Chemical and Engineering News,* v. 33, Feb. 14, 1955, p. 648, 650.
Preparation, reactions and technology of this unique alloy. Flowsheet, table, phase diagram.
(Na, K)

85-V. Where Is Titanium Headed? *Chemical Week,* v. 76, Feb. 19, 1955, p. 34 + 11 pages.
Reviews market, applications and technology. Graph, flowsheet.
(A general, Ti)

86-V. Nodular Cast Iron—Its Present Position and Future Prospects as an Engineering Material, With Special Reference to Its Suitability for Crankshafts. S. B. Bailey. *Institution of Mechanical Engineers, Proceedings,* v. 168, no. 24, 1954, p. 643-657 + 12 plates; disc., p. 657-678.
Review of production, properties and applications. Diagrams, photographs, micrographs, graphs, tables. 43 ref. (T7, CI)

87-V. Titanium—Its Progress and Applications. T. E. Perry and R. J. Garmy. *Iron and Steel Engineer,* v. 32, Feb. 1955, p. 98-105; disc., p. 105-106.
Review of titanium metallurgy. Applications in jet engines.
(T25, Ti)

88-V. General Physical Metallurgy of Titanium Reviewed. Robert I. Jaffee. *Journal of Metals,* v. 7, Feb. 1955, p. 247-252.
Review of alloying effects and possibilities, structures and improvements in mechanical properties. Graphs, tables, micrograph. 7 ref. (Ti)

89-V. Titanium Alloy Extrusions

Now Available. G. A. Moudry. *Materials & Methods,* v. 41, Feb. 1955, p. 86-87.

Advantages of extrusions over rolled shapes, properties. Photographs. (Ti)

90-V. Looking Ahead in Uranium. W. B. Hall. *Mines Magazine,* v. 45, Jan. 1955, p. 16, 36, 46.

Possibilities of future growth in the uranium industry. (U)

91-V. Heat Resistant Cast High Alloys. C. K. Lockwood. *Product Engineering,* v. 26, Feb. 1955, p. 163-167.

Properties and applications of ACI class I (18 to 30% chromium), class II (18 to 32% chromium, 8 to 22% nickel), and class III (33 to 68% nickel, 10 to 21% chromium) alloys. Tables, graphs, photographs. (SS, SG-h)

92-V. The Corrosion-Resisting High-Silicon Iron Alloys. J. Dodd. *Corrosion Technology,* v. 2, Feb. 1955, p. 37-42.

Production, properties, structure, application. Tables, micrographs, graph, photograph. (Si, Fe)

93-V. Super Purity Aluminium. Production, Properties and Applications. E. E. Spillett. *Metallurgia,* v. 51, no. 304, Feb. 1955, p. 59-64.

Double electrolytic process, corrosion resistance, mechanical and physical properties, applications. Diagram, tables, photographs, graph. 3 ref. (Al)

94-V. Aluminium and Its Alloys in 1954. Some Aspects of Research and Technical Progress Reported. E. Elliott. *Metallurgia,* v. 51, no. 304, Feb. 1955, p. 65-74.

Review of published data. 125 ref. (Al)

95-V. Zinc and Its Uses: 1952-54. *Metallurgia,* v. 51, no. 304, Feb. 1955, p. 93-99.

Production and consumption of metal, alloys and zinc oxide. Tables, photographs. 31 ref. (Zn)

96-V. (Pamphlet.) **Facts About Manganese.** 22 p. 1953. Bureau of Mines, U. S. Department of the Interior, Washington, D. C.

Uses, history, sources, production processes, future supply prospects. (Mn)

97-V. (Pamphlet.) **Thermenol. A Non-Strategic Aluminum-Iron Base Alloy for High-Temperature Service.** J. F. Nachman and W. J. Buehler. PB 111530, June 1954, 14 p. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.50.

Production techniques; control of grain structure; effects of impurities; mechanical and physical properties. Tables, photographs, diagrams. (Fe, Al, SG-h)

98-V. Titanium Reference Sheet. I. G. E. Hutchinson. *Chemical Engineering Progress,* v. 51, Mar. 1955, p. 34.

Data on Rem-Cru products. (Ti)

99-V. The Heat-Treatment, Inspection, and Testing of Wrought Nickel and Nickel Alloys. W. Betteridge and T. E. Cound. *Institute of Metals, Journal,* v. 83, Feb. 1955, p. 262-270 + 2 plates.

Processing procedures; inspection methods; process testing. Tables, micrographs, photographs. 14 ref. (J general, S general, Ni)

100-V. Austenitic Manganese Steel. Properties and Uses. T. H. Arnold. *Iron & Steel,* v. 28, Mar. 1955, p. 95-97.

Mechanical properties, heat treatment, structure and applications. Micrographs. (AY)

101-V. Chromium-Base Alloys. R. G. Nelson and H. G. Anderson. *U. S. Bureau of Mines, Report of Investigations,* 5107, Jan. 1955, 20 p.

Development of chromium-rich alloys for high-temperature uses with high-purity chromium produced by a hydrogen-treatment method. Tables, graph, photographs, micrographs. (Cr)

102-V. (French.) **Studies of Ni-Cu, Cr-Cu, and Ni-Cr-Cu Steels With Structural Hardening.** H. Laplanche. *Métallurgie et la construction mécanique,* v. 87, no. 2, Feb. 1955, p. 107-109, 111, 113-115, 117.

Structures, transformations, corrosion resistance and mechanical properties of copper-bearing steels. Diagrams, graphs, tables. 22 ref. (AY)

103-V. (French.) **High Strength "ALS" Steels for Light Construction.** Aldo Bartocci. *Métaux, Corrosion-Industries,* v. 30, no. 353, Jan. 1955, p. 18-33.

Properties and applications of new Italian low-alloy steels. Tables, micrographs, graphs, photographs. (AY)

104-V. (French and German.) **Scientific Knowledge of Metals.** Th. Zürrer. *Pro-Metal,* v. 7, no. 43, Feb. 1955, p. 456-467.

Compositions and properties of various bronzes and German silver. Graphs, diagrams, tables, photographs. 3 ref. (Cu, Ni, Zn)

105-V. (Russian.) **Titanium: Proper-**

ties, Uses, and Methods of Producing It. I. I. Kornilov. *Uspekhi Khimii,* v. 23, no. 5, 1954, p. 529-546.

Survey of work, including author's own recent contributions. Tables, graphs, diagrams. 37 ref. (Ti)

106-V. Aluminum 4032. Heat Treatable Aluminum Forging Alloy. *Alloy Digest,* no. Al-25, Apr. 1955.

Composition, physical constants, properties, heat treatment, machinability, weldability and applications. (F22, Al)

107-V. Eastern Z-Metal. Pearlitic Malleable Iron. *Alloy Digest,* no. CI-10, Apr. 1955.

Composition, physical constants, properties, castability, machinability, heat treatment, weldability and applications. (CI)

108-V. Muntz Metal. High Strength Brass. *Alloy Digest,* no. Cu-25, Apr. 1955.

Composition, physical constants, properties, machinability, weldability, heat treatment, workability, corrosion resistance and applications. (Cu)

109-V. Durichlor. High Silicon Iron. *Alloy Digest,* no. Fe-7, Apr. 1955.

Composition, physical constants, machinability, corrosion resistance, weldability and applications. (Fe)

110-V. "KR" Monel. Corrosion-Resistant Nickel-Base Alloy. *Alloy Digest,* no. Ni-18, Apr. 1955.

Physical constants, composition, properties, heat treatment, machinability, grinding, weldability, corrosion resistance, pickling and applications. (Ni)

111-V. AISI 3140. Nickel-Chromium Alloy Steel. *Alloy Digest,* no. SA-29, Apr. 1955.

Composition, physical constants, properties, heat treatment, weldability, machinability and applications. (AY)

112-V. Rem-Cru C-110M. Titanium-Base Alloy. *Alloy Digest,* no. Ti-6, Apr. 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance, cleaning and applications. (Ti)

113-V. Solar. Water-Tough Tool Steel. *Alloy Digest,* no. TS-32, Apr. 1955.

Composition, properties, heat treatment, machinability, workability, weldability and applications. (TS)

114-V. Titanium in Cast Iron. George F. Comstock. *Foundry,* v. 83, Apr. 1955, p. 118-123.

Effect of titanium on microstructure, mechanical properties, machinability and corrosion resistance. Photographs, micrographs, tables. 29 ref. (Ti, CI)

115-V. Titanium Fills Need for Super Material in Aircraft of the Future. N. E. Promisel. *Journal of Metals,* v. 7, Mar. 1955, p. 443-448.

Review of properties, applications, production statistics and future possibilities. Photographs, graphs, table. 2 ref. (T24, Ti)

116-V. Rhenium Metal. Chester T. Sims. *Materials & Methods,* v. 41, Mar. 1955, p. 109-111.

With development of suitable fabricating techniques, the interesting physical, mechanical, chemical and electronic properties of this new metal are now being exploited. Production methods, properties, fabrication procedures and applications. Photographs, graph, table. 6 ref. (Re)

117-V. Materials Engineering File Facts. Cast Stainless Steels. *Materials & Methods,* v. 41, Mar. 1955, p. 139, 141, 143.

Mechanical, physical, corrosion and fabricating properties; applications. (SS)

118-V. (Book.) **Package of Reports on Titanium and Its Alloys.** Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. \$40.00.

Collection of 42 reports covering all phases of the production, working, applications, and properties of titanium and titanium alloys. (Ti)

119-V. (Book.) **Titanium in Industry.** Stanley Abkowitz, John J. Burke and Ralph H. Hiltz, Jr. 224 p. 1955. D. Van Nostrand Co., 250 Fourth Ave., New York, N. Y. \$5.00.

The production, properties, and processing of titanium and its alloys; various extracting procedures; heat treatment methods; working, analytical, and metallographic techniques. (Ti)

120-V. (Book.) **Watkins Cyclopedia of the Steel Industry.** 5th Ed. 485 p. 1955. Steel Publications, Inc., 4 Smithfield St., Pittsburgh 30, Pa. \$10.00.

Reference book on the activities of the steel producing and processing industries. (ST)

121-V. What the Future Holds for Titanium. H. H. Kellogg. *Engineer-*

ing and Mining Journal, v. 156, Apr. 1955, p. 72-84.

Uses will be limited to those where weight saving, heat resistance or corrosion resistance justify the extra cost. Tables, flow diagram. (T general, Ti)

122-V. Aluminium-Copper-Cadmium Sheet Alloys. H. K. Hardy. *Institute of Metals, Journal,* v. 83, Mar. 1955, p. 337-346 + 1 plate.

Mechanical, corrosion, and fabricating properties. Tables, micrographs, graphs. 29 ref. (Cu, Cd, Al)

123-V. Hiduminium RR.77. Heat Treatable Aluminum Alloy. *Alloy Digest,* no. Al-26, May 1955.

Composition, physical constants, heat treatment, machinability, workability, weldability and applications. (Al)

124-V. Ampco Metal 12. Aluminum Bronze. *Alloy Digest,* no. Cu-26, May 1955.

Composition, physical constants, mechanical properties, machinability, weldability, corrosion resistance and applications. (Cu)

125-V. Dowmetal R & RC. Magnesium Die Casting Alloys. *Alloy Digest,* no. Mg-17, May 1955.

Composition, physical constants, mechanical properties, castability, machinability, corrosion resistance, finish and applications. (Mg)

126-V. Cerrosafe. Low Temperature Melting Alloy. *Alloy Digest,* no. Pb-2, May 1955.

Composition, physical constants, properties, selection and preparation of mold, casting, melting practice, soldering and applications. (SG-d, Pb)

127-V. Hy-Tuf. Tough, Through-Hardening Steel. *Alloy Digest,* no. SA-30, May 1955.

Composition, physical constants, properties, heat treatment, workability, weldability, machinability and applications. (AY)

128-V. Multimet Alloy (N-155). High-Temperature, Heat-Resistant Alloy. *Alloy Digest,* no. SS-28, May 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability and applications. (SG-h, SS)

129-V. Allegheny Metal 350. Heat Treatable Stainless Steel. *Alloy Digest,* no. SS-29, May 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance and applications. (SS)

130-V. Jessop 2-B. Hot Work Die Steel. *Alloy Digest,* no. TS-33, May 1955.

Composition, properties, heat treatment, machinability, workability and applications. (TS)

131-V. Commercial Zirconium. John L. Everhart. *Materials & Methods,* v. 41, Apr. 1955, p. 112-115.

Physical and mechanical properties, corrosion resistance, fabrication and applications. Photographs, tables, graph. 7 ref. (Zr)

132-V. Tool Steels and Their Application. R. F. Spillett. *Tool Engineer,* v. 34, May 1955, p. 71-77.

Deals with heat treating, composition and uses of tool steels. Photographs, diagrams, graph, tables. (T general, TS)

133-V. (English.) **Extra Low Carbon Stainless Steels.** *Aciers Fins & Spéciaux Francais,* 1954, no. 18, Dec., p. 87-89.

Manufacture, corrosion resistance, fabrication properties and applications. Photographs. (SS)

134-V. (French.) **Study of Some Austenitic Nodular Cast Irons.** Jacques Grilliat. *Fonderie,* 1955, no. 109, Feb., p. 4373-4384.

Composition, mechanical and physical properties of Ni-Resist. Diagram, micrograph, tables, graph. 12 ref. (CI)

135-V. (French.) **Influence of Impurities on the Properties of Sand-Molded Bronzes.** Pierre Julien Le Thomas. *Fonderie,* 1955, no. 109, Feb., p. 4392-4396.

Influence of iron, manganese, aluminum, sulfur, phosphorus, antimony and arsenic on properties and structure. Graphs, table, micrograph. 29 ref. (E11, Cu)

136-V. (French.) **High-Strength Cast Irons Without Special Elements.** J. Pascal. *Métallurgie et la construction mécanique,* v. 87, no. 3, Mar. 1955, p. 173, 175, 177, 179.

Bibliography on techniques of producing high-strength castings. (To be continued.) (CI)

137-V. (French.) **The Platinum Metals.** Albert Portevin. *Revue de métallurgie,* v. 52, no. 3, Mar. 1955, p. 173-178.

Development, extraction, refining, production, characteristics and uses of platinum. Tables. 2 ref. (EG-c, Pt)

138-V. (German.) **Structure, Mechanical Behavior, and Standardization of Gray Cast Iron in the Light of a Bivariant System.** A. Collaud. *Schweizer Archiv für angewandte Wissen-*

schaft und Technik, v. 21, no. 3, Mar. 1955, p. 65-76.

Theoretical and experimental investigation of composition and heat treatment and their influence on physical properties of gray cast iron. Tables, diagrams. (To be continued.) (P general, M general, CI)

139-V. (Russian.) **Manganese-Titanium Pearlitic Malleable Cast Iron.** P. P. Berg and N. D. Titov. *Liteinoe Proizvodstvo,* 1955, no. 3, Mar., p. 9-10.

Influence of varying amounts of titanium and manganese additions on the structure and properties of cast iron; heat treatment conditions. Graph.
(M general, P general, CI, Ti, Mn)

140-V. Cast High Strength Irons to Standard Stock Sizes and Shapes. Oliver Smalley. *Iron Age,* v. 175, Apr. 21, 1955, p. 100-102.

Microstructure, properties and applications of Meehanite cast iron. Photographs, microscopes, table. (CI)

141-V. Titanium Fabrication Study. *Light Metal Age,* v. 13, Apr. 1955, p. 16 + 4 pages.

Highlights of investigation conducted on various fabrication techniques. Photographs.
(F general, G general, Ti)

142-V. Wrought Stainless Steel. Basil T. Lanphier. *Machine Design,* v. 27, May 1955, p. 183-190.

Machinability, hot and cold working, forging, cutting and shearing, stamping, deep drawing, welding, brazing, soldering and finishing. Tables, photographs. (SS)

143-V. Gray Iron. C. F. Walton. *Machine Design,* v. 27, May 1955, p. 190-193.

Castability, section sensitivity, machinability, finishing, specifications. Tables, photographs, graph. (CI)

144-V. Malleable Iron. James H. Lansing. *Machine Design,* v. 27, May 1955, p. 194-196.

Castability, tolerances, machinability, standards. Table, photographs. (CI)

145-V. Cast Steel. Charles W. Briggs. *Machine Design,* v. 27, May 1955, p. 196-202.

Castability, tolerances, weldability, machinability. Graphs, tables, photographs. 3 ref. (CI)

146-V. Cast Stainless Steel. E. A. Schoefer. *Machine Design,* v. 27, May 1955, p. 203-205.

Machinability, welding procedures, heat treatment. Photographs, tables. (SS)

147-V. Wrought Aluminum Alloys. T. F. McCormick. *Machine Design,* v. 27, May 1955, p. 213-219.

Heat treatment, cold forming, machinability, extrusion, forging, welding, brazing, soldering, finishing. Photographs, table. (Al)

148-V. Cast Aluminum Alloys. G. W. Birdsall. *Machine Design,* v. 27, May 1955, p. 220-227.

Castability, machinability, weldability, finishing. Photographs, tables. (Al)

149-V. Magnesium Alloys. Paul L. Filter. *Machine Design,* v. 27, May 1955, p. 228-231.

Castability, formability, machinability, weldability, finishing characteristics. Photographs, tables. (Mg)

150-V. A High Strength Zirconium Alloy: Zirconium—4 w/o Tin—1.6 w/o Molybdenum. W. Chubb, G. T. Meuhlenkamp and G. K. Manning. *U. S. Atomic Energy Commission, BMI*-987, Mar. 18, 1955, 26 p.

A heat treatable, ternary alloy is readily rolled at 800°C. and has more than four times the creep strength of pure zirconium at 500°C. The alloy is harder in the air-quenched condition than as water quenched. Behavior was found to be associated with a reaction similar to age hardening. In the annealed condition, the strength of the alloy is insensitive to minor compositional changes. Graphs, tables, micrographs. 7 ref. (Zr)

151-V. (French.) **Nickel Bronzes.** *Fonderie,* 1955, no. 110, Mar., p. 4438-4441.

Structure of copper-nickel-tin alloys, causes of failure, fusion testing. Tables, diagrams. 4 ref. (Cu, Ni)

152-V. (Book.) **Magnesium Design Notes.** 136 p. 1954. Dow Chemical Co., Midland, Mich.

Mechanical, physical, and fabricating properties. Stability of treated surfaces. (Mg)

153-V. The Coppers. XI. *Copper & Brass Bulletin,* 1955, May, no. 173, p. 8-9.

Composition and properties. Photographs, table. (Cu)

154-V. How Users Benefit From Pearlitic Malleable Castings. G. B. Mannweiler. *Iron Age,* v. 175, May 19, 1955, p. 111-114.

Cast pearlitic alloys cover a wide range of strength and hardness

values, can be heat treated to meet service conditions, offer excellent machinability, good surface finish and intricate, close tolerance castability. Micrograph, graph, photographs. (CI)

155-V. Some Recent Developments in Stainless Steels. J. I. Morley. *Iron & Steel,* v. 28, May 1955, p. 183-188.
Heat treatment, mechanical properties, structure of precipitation-hardening chromium-nickel steels. Advantages and disadvantages of cold worked stainless steels. Tables, graphs, micrograph. 8 ref. (SS)

156-V. Metallurgical Properties of Silver-Cadmium-Copper-Zinc Brazing Alloys. Karl M. Weigert. *Welding Journal,* v. 34, May 1955, p. 421-424.
Formation and physical properties of metallurgical phases. Graphs. 9 ref. (SG-f)

157-V. (Polish.) **Low-Alloy Construction Steels With Boron Addition.** S. Wojciechowski. *Hutnik,* v. 22, no. 1, 1955, p. 23-30.
Survey of Russian, English and German, and native articles on contemporary production, chemical analyses of various boron steels, their uses and effect of boron on hardenability. Tables, graphs. 24 ref. (AY)

158-V. Ternalloy 5. Aluminum Casting Alloy. *Alloy Digest,* no. Al-27, June 1955.
Composition, physical constants, properties, heat treatment, machinability, castability, weldability, corrosion resistance, specification equivalents and applications. (Al)

159-V. Chromium Carbide Grade 608. Heat and Wear Resistant Alloy. *Alloy Digest,* no. Cr-1, June 1955.
Composition, physical constants, properties, fabricating, joining, corrosion resistance, heat resistance and applications. (Cr)

160-V. Max-EL 1-B Machinery Steel. *Alloy Digest,* no. CS-3, June 1955.
Composition, properties, machinability, workability, weldability, heat treatment and applications. Graphs. (CN)

161-V. Phosphor Bronze. High Strength, Corrosion Resistant Alloy. *Alloy Digest,* no. Cu-27, June 1955.
Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance, specification equivalents and applications. (Cu)

162-V. Chlorimet No. 3. Acid Resistant Alloy. *Alloy Digest,* no. Ni-19, June 1955.
Composition, physical constants, properties, machinability, weldability, heat treatment, corrosion resistance and applications. (Ni)

163-V. Allegheny Metal 25-20B. Heat & Corrosion Resistant Steel—Type 314. *Alloy Digest,* no. SS-30, June 1955.
Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance, specification equivalents and applications. (SS)

164-V. Uniloy 1420 WM. Corrosion and Heat Resistant Steel. *Alloy Digest,* no. SS-31, June 1955.
Composition, physical constants, properties, heat treatment, machinability, corrosion resistance, scale removal, forgeability, weldability and applications. (SS)

165-V. Ottawa—60. High Vanadium Die Steel. *Alloy Digest,* no. TS-34, June 1955.
Composition, properties, heat treatment, critical temperatures, machinability, workability and applications. (TS)

166-V. Metallurgical Developments in Copper-Base Alloys. J. S. Vanick. *Foundry,* v. 83, June 1955, p. 96-99.
Alloy compositions, properties, foundry practice. Photographs, tables. 4 ref. (E general, Cu)

167-V. Selenium Data. J. D. Sargent. *U. S. Bureau of Mines, Information Circular* 7715, Apr. 1955, 29 p.
Physical and chemical properties, geology and mineralogy, geographic distribution and foreign production, domestic production, consumption and foreign trade. Tables, graph, map, diagram. 192 ref. (Se)

168-V. (Dutch.) **New Points of View on Alloyed Types of Structural and Machine Steel.** André Michel. *Metalen,* v. 10, no. 8, Apr. 30, 1955, p. 103-109.
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169-V. (French.) **Magnesium-Zirconium Alloy Castings in Aircraft Production.** M. R. Pradeau. *Technique et science aéronautiques,* v. 1, 1955, p. 23-29.
Chemical composition, crystal structure and mechanical properties, fields of application. Tables, graphs, photographs. 6 ref. (T24, Mg)

170-V. (Book.) **Boron Steels—Production and Use. Technical Assistance Mission No. 124.** 140 p. 1954. Organisation for European Economic Co-Operation, 2, rue André-Pascal, Paris.
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Summary of the discussion between European and U. S. experts. (AY)

171-V. (Book.) **Magnesium Laboratory Methods.** 146 p. 1955. Dow Chemical Co., Midland, Mich.

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172-V. Some Metallurgy and Physics of Germanium. L. W. Davies. *Australasian Engineer,* 1955, Apr., p. 66-71.

Description of the semiconducting electrical properties of germanium and techniques for the production of single-crystal germanium alloys with the properties required for the fabrication of junction transistors. Diagrams, photographs.
(P15, T1, Ge)

173-V. The History and Development of Aluminium and Its Alloys. A. von Zeerleder. *Engineers' Digest,* v. 16, May 1955, p. 217-220.

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Uses and advantages, titanium ores, manufacture of titanium sponge, melting and rolling. Map, graph, table. (Ti)

175-V. Permanent Magnet Steels and Alloys. F. Knight. Paper from "Magnetic Alloys and Ferrites". George Newnes Ltd., p. 95-147.

Advances made in permanent magnet technique; diffusion and precipitation hardening alloys; physical and mechanical properties; permanent magnet design; testing and demagnetizing; applications; micropowder magnets. Photographs, graphs, tables, diagrams. (SG-n)

176-V. (French.) **The Platinum Group Metals.** Edmund Merriman Wise. *Revue de métallurgie,* v. 52, no. 4, Apr. 1955, p. 265-286.

Industrial and jewelry uses, alloy compositions, properties. Tables, diagrams, graphs, photographs. 61 ref. (EG-c)

177-V. (German.) **Structure, Mechanical Behavior, and Standardization of Gray Iron in the Light of a Divariant System.** A. Collaud. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 5, May 1955, p. 151-161.

Effects of heat treatment and correlations between the different mechanical properties; possible metallurgical measures of improving the properties of gray iron, proposition on the standardization of its quality. Tables, graphs. (CI)

178-V. Nionel Reference Sheet. I. W. Z. Friend. *Chemical Engineering Progress,* v. 51, May 1955, p. 66.

Description, composition, chemical and mechanical properties of this new alloy. (To be continued.) (Ni)

179-V. Iron and Steel—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2D-21D.

Past, present and future developments in furnaces, alloys, galvanizing, rolling and raw materials. Photographs.
(D general, L16, F23, Fe, ST)

180-V. Nonferrous Metals—1855 to 1955. *Iron Age (100th Anniversary Issue),* v. 175, June 1955, p. 2H-17H.

Developments in properties, processing and applications. Photographs. (EG-a)

181-V. French Aluminium Industry. Maurice Moyal. *Metal Industry,* V. 86, June 17, 1955, p. 509-511.

Raw materials extraction, fabrication, new projects. Photographs. (Al)

182-V. Materials Handbook. VIII. Properties of Molybdenum. Harry Majors, Jr., R. H. Wallace, G. E. Wendell, and R. T. Webster. *U. S. Atomic Energy Commission,* CRD-A19-27, 1953, 26 p.

Mechanical, physical and fabrication properties. Tables, graph. 17 ref. (Mo)

183-V. A Review of Aluminium Alloy as Engineering Materials. J. R. Handforth. *Welding and Metal Fabrication,* v. 23, June 1955, p. 204-210.

Alloy compositions and properties forming methods; applications. Tables, photographs, graphs. (Al)

184-V. Molybdenum. A High-Temperature Structural Metal. William M. Fraser and Robert T. Freeman. *Westinghouse Engineer,* v. 15, July 1955, p. 130-133.

Properties, working, machining, joining, applications, future prospects. Photographs, diagrams. (Mo)

185-V. (Pamphlet.) **The Fabrication and Properties of 16-Alfenol—A Non-Strategic Aluminum-Iron Alloy.** PB 111552. 27 p. 1953. Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. $0.75.

It can be fabricated in sheets and tape in thickness down to 0.0003 in., opening the possibility of applications taking advantage of its other useful properties as well as its magnetic qualities. (Al)

186-V. (Book.) **Metallurgy of the Rarer Metals. Pt. III. Manganese.**

A. H. Sully. 305 p. 1955. Academic Press, Inc., 125 East 23rd St., New York 10, N. Y.
History; occurrence; production; alloys; properties; applications. (Mn)

187-V. Aluminum 5086. High Strength Wrought Aluminum Alloy. *Alloy Digest,* no. Al-28, July 1955.
Composition, physical constants, mechanical and physical properties, fabrication, forms available and applications. Tables. (Al)

188-V. Alar 00.5. Aluminum Casting Alloy. *Alloy Digest,* no. Al-29, July 1955.
Composition, physical constants, mechanical and physical properties, fabrication, forms available and applications. Tables. (Al)

189-V. NI-Resist. Heat & Corrosion Resistant Cast Iron. *Alloy Digest,* no. CI-11, July 1955.
Composition, physical constants, mechanical and physical properties, fabrication, forms available and applications. Tables. (SG-h, CI)

190-V. Cupaloy. High Conductivity Copper Alloy. *Alloy Digest,* no. Cu-28, July 1955.
Composition, physical constants, mechanical and physical properties, general characteristics, forms available and applications. Tables. (Cu)

191-V. Elektron Zreo. Creep Resistant Magnesium Alloy. *Alloy Digest,* no. Mg-18, July 1955
Composition, physical constants, mechanical and physical properties, fabrication, surface treatment, forms available and applications. Tables. (Mg)

192-V. U. S. S. Man-Ten. High Strength Steel. *Alloy Digest,* no. SA-31, July 1955.
Composition, mechanical and physical properties, fabrication, forms available and applications. Tables. (AY)

193-V. Armco 25-12. Heat Resistant Steel, Types 309 & 309S. *Alloy Digest,* no. SS-32, July 1955.
Composition, physical constants, mechanical and physical properties, fabrication, forms available and applications. Tables. (SS)

194-V. Electrite CO-6. Cobalt High-Speed Steel, Type M36. *Alloy Digest,* no. TS-35, July 1955.
Composition, physical constants, mechanical and physical properties, forms available and applications. Tables. (TS)

195-V. Development and Application of Tool Steels. I. B. M. Hamilton. *Canadian Metals,* v. 18, July 1955, p. 39-41.
A review of the early development and applications and the advantages and disadvantages of their use today. Graph, micrographs. (To be continued.) (TS)

196-V. Spring Materials. *ISA Journal,* v. 2, July 1955, p. 257-260.
Data sheets on glossary of terms, alloys, properties and applications. Table, graph. (SG-b)

197-V. Recent Aluminium Casting Developments. L. Fletcher. *Metal Industry,* v. 87, July 8, 1955, p. 23-27.
Alloys, applications, properties and foundry techniques. Photographs. (Al)

198-V. Rem-Cru A-110AT. *Rem-Cru Titanium Data Sheet,* 1955, June 1, 8 p.
Alloy design, applications, forms available, physical and mechanical properties, corrosion resistance, fabricating, heat treating and welding. Tables, graphs. (Ti)

199-V. (French.) **High Strength Cast Irons Without Special Elements.** J. Pascal. *Métallurgie et la construction mécanique,* v. 87, no. 5, May 1955, p. 369, 371, 373, 375.
Properties and production of high-strength pearlitic cast iron. Graphs. (To be continued.) (CI)

200-V. (German.) **Most Recent Developments in Magnesium.** Charles E. Nelson. *Zeitschrift für Metallkunde,* v. 46, no. 5, May 1955, p. 338-349.
Production and properties of magnesium and its alloys; methods of melting, casting, alloying, processing and welding; uses in industry. Flowsheet, tables, graphs, micrographs, photographs, diagram. 8 ref. (Mg)

201-V. Commercially Pure Iron. E. N. Simons. *Canadian Mining Journal,* v. 76, July 1955, p. 66-67.
Advantages and properties of high-purity iron, production methods, necessary precautions in fabrication procedures. Graphs. (Fe)

202-V. Titanium Problems and Opportunities, Spring 1955. Walter L. Finlay, C. I. Bradford and W. E. Gregg. *Light Metals,* v. 18, July 1955, p. 230-233.
Factors which are holding back greater increases in its use in aircraft, measures for minimizing or correcting them. Graphs. (Ti)

203-V. Historical Note on Sources and Uses of Beryllium. Robert F. Griffith. Paper from "The Metal Beryllium". American Society for Metals, p. 5-13.
Source of minerals, recovery, source countries, development of the

industry, development of uses, outlook. Tables. 11 ref. (Be)

204-V. Beryllium-Rich Alloys. A. R. Kaufmann and P. Corzine. Paper from "The Metal Beryllium". American Society for Metals, p. 555-569.

Reviews possible approaches to the production of an alloy without the fatal brittleness of the pure metal, yet possessing low density, combined with high strength, high melting point and good moderating characteristics for neutrons. Diagrams, graphs, table. 26 ref. (Be)

205-V. (German.) **Bimetals.** Walter Rienäcker. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 429-434.

Contact and thermo bimetals, alloys utilized, elongation behavior, properties of industrial thermo bimetals. Table, graphs, diagram. 5 ref. (SG-a)

206-V. (German.) **Alloys of Indium.** Siegfried Valentiner. *Zeitschrift für Metallkunde,* v. 46, no. 6, June 1955, p. 442-449.

Critical survey of metallurgical research on indium alloys, particularly from the point of view of the position of indium in the periodic system. Tables, phase diagrams. 86 ref. (In)

207-V. (Polish.) **Brasses With Low Copper Content.** Czeslaw Adamski. *Przeglad Odlewnictwa,* v. 4, no. 5, May 1954, p. 123-132; no. 6, June 1954, p. 157-162.

Effect of iron, manganese, silicon and other alloying elements on mechanical properties and corrosion resistance; applications. Micrographs, tables, photographs, graphs. 22 ref. (Cu)

208-V. Aluminum 5357. Non-Heat-Treatable Aluminum Alloy. *Alloy Digest,* no. Al-30, Aug. 1955.

Composition, physical constants, properties, machinability, workability, weldability, characteristics, forms available and applications. Tables. (Al)

209-V. Refractaloy 80. Precipitation-Hardened Super Heat-Resistant Alloy. *Alloy Digest,* no. Co-7, Aug. 1955.

Properties, composition, physical constants, heat treatment, machinability, workability, weldability, characteristics, forms available and applications. Tables. (SG-h, Co)

210-V. Mallory 100. Age-Hardenable Beryllium Copper Alloy. *Alloy Digest,* no. Cu-29, Aug. 1955.

Properties, physical constants, composition, machinability, workability, joining, pickling, heat treatment, corrosion resistance, characteristics, forms available and applications. Tables. (Cu, Be)

211-V. Nilvar. Low Expansion Alloy. *Alloy Digest,* no. Fe-8, Aug. 1955.

Properties, physical constants, composition, heat treatment, pickling, machinability, workability, weldability, corrosion resistance, characteristics and applications. Tables. (SG-s, Fe)

212-V. Permanickel. Age-Hardenable, High Strength, Corrosion-Resistant Nickel-Base Alloy. *Alloy Digest,* no. Ni-20, Aug. 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, joining, pickling, corrosion resistance and applications. Tables. (Ni)

213-V. Jalloy 7. Manganese-Molybdenum Alloy Steel. *Alloy Digest,* no. SA-32, Aug. 1955.

Composition, properties, heat treatment, weldability, machinability and applications. Tables. (AY)

214-V. Rezistal 310 & 310S. Heat & Corrosion Resistant Steel. *Alloy Digest,* no. SS-33, Aug. 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, heat and corrosion resistance, specification equivalents, characteristics and applications. Tables. (SS)

215-V. Firth-VC. High Speed Abrasion Resistant Steel. *Alloy Digest,* no. TS-36, Aug. 1955.

Composition, properties, heat treatment, machinability, forms available and applications. (SG-j, TS)

216-V. Developments in Low-Alloy Steels for Welded Structures. C. L. M. Cottrell. *Alloy Metals Review,* v. 8, June 1955, p. 2-6.

Factors involved; shows, by means of austenite transformation data, influence of composition and other variables on the characteristics of some of these steels during welding. Table, graphs. 14 ref. (K general, AY-n)

217-V. Beyond the Metals. I-II. Van Caldwell. *Steel,* v. 137, Aug. 1, 1955, p. 72-74; Aug. 8, 1955, p. 73-76.

New super refractories and new uses for the older ones. Table, diagram, photographs. (SG-h)

218-V. (French.) **Alloys of the Platinum Metals. General Outline of Work in Recent Years.** Ernst Raub. *Revue de métallurgie,* v. 52, no. 6, June 1955, p. 429-439; disc., p. 439-440.

Problems relating to equilibrium

diagrams of the palladium-manganese, palladium-chromium and platinum-manganese systems, and of the gold-platinum-palladium and palladium-copper, with gold or silver, alloys; combinations of the six platinum metals with metals of the third, up to the sixth, group of the periodic system; classified phases and changes of properties due to their appearance in the alloys with manganese, chromium and cobalt. Graphs, tables, diagrams. 28 ref. (EG-c)

219-V. (German.) **Development and Today's Status of the Weldable Structural Steel St. 52.** E. Folkhard. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 6, June 1955, p. 183-198.

Composition of St. 52 steel in Germany, France, Belgium, Austria, England and the United States; mechanical properties; selection of welding electrodes; heat treatment. Tables, graphs, micrographs, photographs, diagrams. 14 ref. (Q general, K1, J general, AY)

222-V. (German.) **Properties and Weldability of Nonmagnetizable Steels.** Franz Rapatz and Alfred Schmidt. *Schweisstechnik,* v. 9, no. 5, May 1955, p. 49-55.

Composition, strength and electrical properties, and field of application of nonmagnetizable steels. Method and optimum conditions of welding. Tables, diagrams, photographs. (K9, ST)

223-V. (Book.) **The Metal Beryllium.** D. W. White, Jr. and J. E. Burke, editors. 703 p., 1955. American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio. $8.00.

Primary concern of the book is the metal beryllium, but certain beryllium-rich compounds are also covered. Use of beryllium as an alloying element, as well as its use in atomic energy. Papers are individually abstracted. (Be)

224-V. How to Work Titanium and Its Alloys. Anderson Ashburn. *American Machinist,* v. 99, Aug. 15, 1955, p. 89-104.

Comprehensive summary of where titanium stands today in production and use, properties that can be expected, and current practice in heat treating, machining, forming, casting, welding, cleaning and finishing. Photographs, diagrams, graphs, tables. (Ti)

225-V. Cold Reduced, Low Carbon, Sheet Steel. N. G. Fraser and J. M. Butler. *Australasian Engineer,* 1955, June, p. 41-47.

Physical and chemical characteristics, modern practices in production and fabrication. Photographs, micrographs, tables. 3 ref. (Q general, E general, F general, CN)

226-V. On Austenitic Malleable Iron. II. Nobuhisa Tsutsumi. *Castings Research Laboratory, Reports, Waseda University,* 1955, no. 6, p. 21-26.

Effects of copper, aluminum, or nickel alloying additions on properties and structure. Tables, diagrams. 3 ref. (P general, Q general, M general, CI)

227-V. Germanium. F. Szekely. *Institution of Electrical Engineers, Journal,* v. 1, July 1955, p. 454-457.

Properties and processes by which germanium is commercially extracted and fabricated for electronic applications. Diagrams, photographs. (C general, T1, Ge)

228-V. A New Titanium Alloy. R. J. McClintick, G. W. Bauer and L. S. Busch. *Materials & Methods,* v. 42, Aug. 1955, p. 90-92.

Available now as forgings, bar, plate and sheet, this aluminum-vanadium-titanium alloy has usable strength up to 1000° F., high tensile and impact strengths, good weldability. Photographs, graphs. (Ti)

229-V. These Hot Work Die Steels Look Promising for Aircraft Structures. Edward A. Loria. *Materials & Methods,* v. 42, Aug. 1955 p. 94-97.

Mechanical physical and fabrication properties of steels that may solve some high-temperature problems in high-speed aircraft. Tables, graphs. 6 ref. (T24, TS)

230-V. What's New in Aluminum Bronze? James S. Vanick. *Modern Castings and American Foundryman,* v. 28, Aug. 1955, p. 24-29.

Indicates modifications to composition 9D (i.e.; corrosion resistance, toughness and proportional limit), and applications for which they become desirable. Photographs, graphs, tables. 6 ref. (Cu)

231-V. (German.) **The Material of the Wrought Iron Age.** Ernst Hermann Schulz. *Archiv für das Eisenhüttenwesen,* v. 26, no. 7, July 1955, p. 365-371; disc., p. 371.

History of the characteristics, properties and compositions of wrought and malleable irons. Tables, graphs, micrograph. 9 ref. (CI, Fe)

232-V. (German.) **Low Melting Metals and Alloys.** H. Spengler. *Metall,* v. 9, nos. 15-16, Aug. 1955, p. 682-685.

Compositions, melting points, properties, uses. Table. 9 ref. (SG-d)

233-V. Aluminum 3003. Wrought Aluminum Alloy. *Alloy Digest,* no. Al-31, Sept. 1955.
Composition, physical constants, properties, heat treatment, machinability, weldability, workability, corrosion resistance, specification equivalents, general characteristics, forms available and applications. (Al)

234-V. Sil-Fos. Silver Brazing Alloy. *Alloy Digest,* no. Cu-30, Sept. 1955.
Composition, physical constants, properties, soldering characteristics, corrosion resistance, specification equivalents, general characteristics, forms available and applications. (Cu, SG-f)

235-V. Mueller 803. High Silicon Bronze. *Alloy Digest,* no. Cu-31, Sept. 1955.
Composition, physical constants, properties, machinability, workability, weldability, corrosion resistance, general characteristics, forms available and applications. (Cu)

236-V. Elektron ZW3. Magnesium Wrought Alloy. *Alloy Digest,* no. Mg-19, Sept. 1955.
Composition, physical constants, properties, machinability, workability, weldability, corrosion resistance, surface treatment, general characteristics, forms available and applications. (Mg)

237-V. AISI 4037. Molybdenum Alloy Steel. *Alloy Digest,* no. SA-33, Sept. 1955.
Composition, physical constants, properties, critical temperatures, heat treatment, machinability, workability, weldability, specification equivalents, general characteristics, forms available, applications. (AY)

238-V. Kanthal-D. Resistance Alloy. *Alloy Digest,* no. SS-34, Sept. 1955.
Composition, physical constants, properties, weldability, corrosion resistance, general characteristics, forms available, applications. (SG-q)

239-V. Duramold A. Air Hardening Hobbing Steel. *Alloy Digest,* no. TS-37, Sept. 1955.
Composition, properties, heat treatment, machinability, workability, weldability, corrosion resistance, general characteristics, forms available and applications. (TS)

240-V. UHB-46. Oil Hardening Tool Steel, Type O1. *Alloy Digest,* no. TS-38, Sept. 1955.
Composition, properties, heat treatment, machinability, workability, specification equivalents, general characteristics, forms available and applications. Graph. (TS)

241-V. British Cast Steels. J. Lomas. *Canadian Mining Journal,* v. 76, Aug. 1955, p. 54-57.
Types, properties and applications. Graphs, tables, photograph. (CI)

242-V. Arc-Cast Molybdenum. *Iron Age,* v. 176, Aug. 4, 1955, p. 79-81.
Larger sizes, higher density and lower gas content are major advantages. The four alloys of molybdenum with 0.3% columbium, 0.5% titanium, 1.0% vanadium, or 2.0% tungsten are evaluated by stress for rupture. Properties and applications. Graphs. (Mo)

243-V. Titanium—A Paradoxical Metal. Hugh W. Cooper. *Modern Metals,* v. 11, Aug. 1955, p. 46, 48.
Properties, applications and present status of development. (Ti)

244-V. (German.) **Titanium, Its Properties and Possible Uses.** O. Rüdiger, H. van Kann and W. Knorr. *Technische Mitteilungen Krupp,* v. 13, no. 2, May 1955, p. 23-38.
Summary review of the history, metallurgy, physical and chemical properties, working, welding, shaping and uses of titanium and its alloys. Tables, diagrams, graphs, micrographs, photographs. (Ti)

245-V. Aluminum 2011. Free-Cutting Wrought Aluminum Alloy. *Alloy Digest,* no. Al-32, Oct. 1955.
Composition, physical constants, properties, heat treatment, machinability, workability, corrosion resistance, specification equivalents, general characteristics, forms available and applications. Tables. (Al)

246-V. Aluminum 5083. Non-Heat-Treatable Wrought Aluminum Alloy. *Alloy Digest,* no. Al-33, Oct. 1955.
Composition, physical constants, properties, workability, weldability, brazing, corrosion resistance, specification equivalents, general characteristics, forms available and applications. Tables. (Al)

247-V. Meehanite—GE. Medium Strength, Close Grain Iron. *Alloy Digest,* no. CI-12, Oct. 1955.
Composition, physical constants, properties, heat treatment, machinability, castability, general characteristics, forms available, applications. Tables. (CI)

248-V. Lumen Alloy 11-C. Aluminum Bronze. *Alloy Digest,* no. Cu-32, Oct. 1955.
Composition, physical constants, properties, heat treatment, machinability, castability, workability, weldability, corrosion resistance, specifi-

cation equivalents, general characteristic, forms available, applications. Tables. (Cu)

249-V. Nitralloy 135. Nitriding Steel. *Alloy Digest*, no. SA-34, Oct. 1955.
Composition, physical constants, properties, machinability, heat treatment, workability, weldability, corrosion resistance, general characteristics, forms available, applications. Tables. (AY)

250-V. Enduro AA-FM. Free-Cutting Stainless Steel-Type 430F. *Alloy Digest*, no. SS-35, Oct. 1955.
Composition, physical constants, properties, heat treatment, workability, machinability, weldability, corrosion resistance, scale removal, specification equivalents, general characteristics, forms available, applications. Tables. (SS)

251-V. Republic RS-140X. Titanium Alloy. *Alloy Digest*, no. Ti-7, Oct. 1955.
Composition, physical constants, properties, heat treatment, machinability, workability, weldability, general characteristics, forms available, applications. Tables. (Ti)

252-V. Graph-Tung. Graphitic Tool & Die Steel. *Alloy Digest*, no. TS-39, Oct. 1955.
Composition, properties, heat treatment, machinability, workability, general characteristics, forms available, applications. Tables. (TS)

253-V. Materials Handbook. IV. Properties of Titanium. Harry Majors, Jr., R. T. Webster, R. H. Wallace and G. E. Wendell. *California Research and Development Company, (U. S. Atomic Energy Commission)*, CRD-A19-27, Apr. 1953, 60 p.
Summarizes current knowledge of properties, creep and rupture, fatigue, fabrication characteristics. Tables, graphs. (Ti)

254-V. Materials Handbook. VII. Properties of Tantalum. H. Majors, Jr., R. H. Wallace, R. T. Webster and G. E. Wendell. *California Research and Development Company, (U. S. Atomic Energy Commission)*, CRD-A19-27, Apr. 1953, 25 p.
Summarizes current knowledge of properties, casting and welding behavior. Tables. 10 ref. (Ta)

255-V. Modern Stainless Steels. *Edgar Allen News*, v. 34, Sept. 1955, p. 201-202.
Polishing, soldering and brazing considered. Photographs. (To be continued.) (L10, K7, K8, SS)

256-V. Lead and Its Alloys. Kempton H. Roll. *Industrial and Engineering Chemistry*, v. 47, Sept. 1955, pt. 2, p. 1986-1989.
Research progress, corrosion characteristics, engineering advances. Graph. 43 ref. (Pb)

257-V. Iron and Mild Steels, Including Low Alloy Steels. Homer L. Shaw. *Industrial and Engineering Chemistry*, v. 47, Sept. 1955, pt. 2, p. 1982-1985.
Summarizes information published on iron, mild steels and low-alloys steels in 1954. Photograph. 52 ref. (Fe, ST, AY)

258-V. Nickel, Including High-Nickel Alloys. H. O. Teeple. *Industrial and Engineering Chemistry*, v. 47, Sept. 1955, pt. 2, p. 1990-2006.
Considers alloys containing about 40% or more of nickel or substantial quantities of cobalt, emphasizing the developments in supply sources of nickel and cobalt, new alloys or improvements in present ones, fabrication, applications. Photograph. 266 ref. (Ni, Co)

259-V. Stainless Steels, Including Other Ferrous Alloys. Walter A. Luce. *Industrial and Engineering Chemistry*, v. 47, Sept. 1955, pt. 2, p. 2023-2035.
Discussion of corrosion, mechanical properties and structure, high-temperature alloys, welding, miscellaneous iron-base alloys. Photographs. 198 ref. (SS, AY)

260-V. Titanium. Howard B. Bomberger. *Industrial and Engineering Chemistry*, v. 47, Sept. 1955, pt. 2, p. 2041-2043.
Most is being used in aircraft frames and engines. Review covers processing and corrosion properties. Photograph. 38 ref. (T24, Ti)

261-V. Low Nickel Type 329 Offers Good Corrosion Resistance. R. A. Lula, W. G. Renshaw and J. B. Hill. *Iron Age*, v. 176, Sept. 8, 1955, p. 74-76.
Structure and properties as compared with other types. Hardening tendency, weld embrittlement, annealing properties. Micrographs, graphs, photograph, tables. (SS)

262-V. Survey of Corrosion-Resistant Metals and Alloys. G. A. Dummett. Paper from "Catalysts, Special Compounds and Chemical-Resistant Materials". Chemical and Chemical Engineering Series. George Newnes Ltd., p. 122-152.
Properties, fabrication, applications, selection criteria for use in chemical plants. Photographs, graph, tables. (SG-g)

263-V. (English.) **Aluminium-Copper-Cadmium Alloys.** E. A. G. Liddiard and H. K. Hardy. Paper from "Congres International de l'Aluminium".

v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 329-338.

Development of the alloys, variation in composition, melting, casting, working techniques, heat treatment, corrosion and stress-corrosion behavior, particular applications. Graphs, tables, photograph, micrographs, diagram. 9 ref. (Al, Cu, Cd)

264-V. (French.) **Heavy Alloys—Manufacturing Processes — Recent Improvements—Applications.** R. Bernard. *Metallurgia italiana,* v. 47, no. 7, July 1955, p. 309-314.

Reviews alloys of densities between that of lead and tungsten; applications of tungsten-nickel-copper and iron alloys. Tables, graphs, micrographs. 3 ref. (W, Ni, Cu, Fe)

265-V. (French.) **Super-Purity Aluminum: Its Development to the Stage of Practical Use.** Werner Syz. Paper from "Congres International de l'Aluminium". v. I. La Société d'Edition et de Documentation des Alliages Légers, p. 173-177; disc., p. 177-178.

Principle of refining aluminum by electrolysis with three superposed layers; development of electrolytic cell design; processing of the segregated crystals and their application to the aluminothermic welding of cables for electrical conductors and to the heating of risers in foundry molds; polishing, anodic oxidation coloring. Photographs. graphs, (Al)

266-V. (Polish.) **Cast Tin Bronzes.** Kazimierz Kurski. *Wiadomosci hutnicze,* v. 11, nos. 7-8, July-Aug. 1955, p. 214-220.

Chemical compositions, mechanical properties, corrosion resistance, microstructure, effect of heat treatment on machine, armature and bearing bronzes. Graphs, tables, micrographs. 6 ref. (Cu)

267-V. (Polish.) **Aluminum.** Kazimierz Doniec. *Wiadomosci hutnicze,* v. 11, nos. 7-8, July-Aug. 1955, p. 229-241.

World production before and after introduction of electrolysis; distribution of ores; production and electrolysis of pure aluminum oxide; uses of aluminum and aluminum alloys. Graphs, diagrams tables, map, photographs. 3 ref. (Al)

268-V. (Russian.) **Properties of 15Kh and 12KhN2A Steels With Boron Addition.** M. V. Pridantsev, G. L. Livshits and D. A. Kal'ner. *Stal',* v. 15, no. 8, Aug. 1955, p. 734-739.

Addition of small amounts of boron considerably increased hardenability, toughness and plasticity, and made it possible to substitute them for structural steels with greater nickel contents. Chemical composition, resistance to wear and isothermal transformation of austenite, other properties. Graphs, tables. (AY)

269-V. High Nitrogen Austenitic Cr-Mn Steels. V. F. Zackay, J. F. Carlson and P. L. Jackson. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 5, 1955, 5 p.

Development of iron-base austenitic alloys, prepared by a pressure-melting and casting technique, capable of service between 1200 and 1400° F. Tables, graphs. 9 ref. (AY)

270-V. Properties of Vanadium Consolidated by Extrusion. C. E. Lacy and C. J. Beck. *American Society for Metals, Transactions,* v. 48, *Preprint No.* 37, 1955, 17 p.

Ductile vanadium, produced by the bomb reduction of V_2O_5 with calcium, was simultaneously consolidated and reduced to shape by hot extrusion. Chemical analyses, mechanical properties, recrystallization, behavior, metallographic structure and cold fabrication behavior were used to evaluate the extruded products. Photographs, graph, micrographs, tables. 8 ref. (F24, V)

271-V. Special Alloys. XII. *Copper & Brass Bulletin,* 1955, no. 174, Sept., p. 8-9.

Composition and properties of cupro-nickel, beryllium-copper, cadmium-bronze and tellurium-nickel-copper. Table, photographs. (Cu)

272-V. Zirconium: New Metal for Industry? Annesta R. Gardner. *Dun's Review and Modern Industry,* v. 66, Oct. 1955, p. 42-44, 52.

Qualities which make it a promising material and limitations to overcome. Photographs. (Zr)

273-V. Less Common Metals. E. M. Sherwood. *Industrial and Engineering Chemistry,* v. 47, Sept. 1955, pt. 2, p. 2044-2050, 2054-2064.

Zirconium, hafnium, molybdenum, tantalum, columbium and rhenium. Photographs, diagram, tables. 86 ref. (Zr, Hf, Mo, Ta, Cb, Re)

274-V. The Alloys of Uranium. H. A. Saller and F. A. Rough. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/558, June 1955, 29 p.

Review of alloying principles, phase diagrams and mechanical and physical properties. Tables, graphs. 22 ref. (U)

275-V. The Metallurgy of Thorium and Its Alloys. O. N. Carlson, P. Chiotti, G. Murphy, D. Peterson, B. A. Rogers, J. F. Smith, M. Smutz, M. Voss and H. A. Wilhelm. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/-

P/556, July 1955, 89 p.

Even though pure metal has poor properties for structural materials, additions of it to other metals are being studied extensively. Graphs, tables, micrographs. 146 ref. (Th)

276-V. Physical Metallurgy of Uranium. Frank G. Foote. *International Conference on the Peaceful Uses of Atomic Energy,* A/CONF.8/P/555, July 1955, 84 p.

Physical and thermal properties, plastic deformation, preferred orientation, recrystallization and grain growth, thermal expansion and cycling, irradiation, mechanical properties, aqueous corrosion, phase diagrams and transformation kinetics in alloys. Graphs, photographs, micrographs, diagrams. 17 ref. (U)

277-V. Preparation of Nuclear Poison and Control Alloys. Stainless Steel Base Boron Alloys. A. P. Beard, C. J. Beck, J. W. Harrison and W. B. Clark. *Knolls Atomic Power Laboratory (U. S. Atomic Energy Commission),* KAPL-1371, June 1955, 31 p.

Preparation, properties and microstructure of stainless steel containing up to 3.2% boron. Table, photograph, graphs, micrographs. 10 ref. (SS, B)

278-V. Nodular or Ductile Iron. John L. Everhart. *Materials & Methods,* v. 42, Oct. 1955, p. 119-134.

Mechanical and physical properties, heat treatment and applications of commercial grades. Photographs, tables, diagram, graphs. (CI)

279-V. Zirconium—Fabrication Techniques and Alloy Development. C. E. Lacy and J. H. Keeler. *Mechanical Engineering,* v. 77, Oct. 1955, p. 875-878.

Neutron-absorption characteristics, mechanical properties, corrosion resistance. Tables, photographs, graphs. (Zr)

280-V. The Selection of Gray Cast Iron. *Metal Progress,* v. 68, Aug. 15, 1955, p. 21-36.

Physical and metallurgical properties of the least expensive of cast metals. Tables, graphs, diagrams, micrographs, photographs. (CI)

281-V. The Selection of Aluminum Alloy Castings. *Metal Progress,* v. 68, Aug. 15, 1955, p. 50-63.

A guide to selection of casting method and alloy for parts; design data and process limitations; typical variations in mechanical properties. Graphs, diagrams, tables. (Al)

282-V. Copper and Its Alloys. John R. Freeman, Jr. *Metal Progress,* v. 68, Sept. 1955, p. 85-87.

Trends and recent developments. Copper has met the challenge of substitute materials by modernizing its equipment and introducing fundamental research into an old industry. Photograph. (Cu)

283-V. Carbon and Alloy Steels. Max W. Lightner. *Metal Progress,* v. 68, Sept. 1955, p. 93-97.

Advances experienced in carbon and alloy steel production in the past 25 years have been characterized by tailoring the steel shape, surface, analysis and metallurgical characteristics to suit the intended fabrication and application. Photographs. (ST)

284-V. Stainless and Heat Resistant Alloys. V. N. Krivobok and E. N. Skinner. *Metal Progress,* v. 68, Sept. 1955, p. 118-122.

Composition and properties of chromium-nickel steels and cobalt and nickel alloys. (SS, SG-g, h)

285-V. Super-Refractory Materials. Roger A. Long. *Metal Progress,* v. 68, Sept. 1955, p. 123 + 7 pages.

Composition and properties. Most promising are the TiC plus metal binder (or vice versa), representing the cermets; MoSi, representing the intermetallics; and molybdenum, representing the refractory elements. Photographs, table. (SG-h)

286-V Light Metals and Alloys. N. E. Promisel. *Metal Progress,* v. 68, Sept. 1955, p. 144-148.

Trends in improvement in properties, applications, future trends. Tables, graphs. (Al, Mg, Ti)

287-V. (Dutch.) Certain Metallurgical Properties of Cast Alloys. E. M. H. Lips. *Bedrijf en Techniek,* v. 10, no. 235, Aug. 27, 1955, p. 422-423, 435; disc., p. 435.

Cutting, milling, forging, extrusion, welding and soldering methods which may be used in working aluminum cast alloys. Tables, diagrams. (Al)

288-V. (Book.) International Aluminum Congress. v. I-II 358 and 333 p. 1954. La Société d'Edition et de Documentation des Alliages Légers, 77 Blvd. Malesherbes. Paris-8e. France.

French and English reports on aluminum chemistry and physiochemistry, production, analytical processes, alloys, anodic oxidation and corrosion, transformation techniques, fields of application. Papers individually abstracted. (Al)

289-V. Alloys for Use at High Temperatures. W. Betteridge. *British Journal of Applied Physics,* v. 6, Sept. 1955, p. 301-306.

Properties necessary in metallic materials intended for service at high temperatures, characteristics

of nickel-base alloys for such applications. Properties discussed include corrosion, creep, fracture resistance. Graphs, micrographs, photographs. 11 ref. (Ni, SG-h)

290-V. Zirconium—Metal With a Future. Frank Charity. *Consulting Engineer,* v. 6, Oct. 1955, p. 56-59.

Refining, fabrication, applications, properties. Photographs, graphs. (Zr)

291-V. Lithium. Daniel P. Eigo, James W. Franklin and George H. Cleaver. *Engineering and Mining Journal,* v. 156, Sept. 1955, p. 75-89.

Facts and figures of value to mines, mill man and investors in nuclear age. Based on peacetime industrial applications alone, lithium industry is showing healthy expansion. Photographs, map, tables, graph, flowsheet. (Li)

292-V. Selenium. E. M. Elkin. *Canadian Metals,* v. 18, Oct. 1955, p. 30, 32, 34-35.

Occurrence, properties, recovery, applications. Photographs. (Se)

293-V. Alnico Magnets for New Meter. H. Wilkinson. *Canadian Metals,* v. 18, Oct. 1955, p. 42-44, 46.

Casting, heat treatment, grinding, testing. Photographs. (SG-n)

294-V. Beryllium and Its Alloys. J. T. Stacy. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 55-94.

Physical, mechanical and metallurgical aspects of use in atomic energy development. Disadvantages are low ductility, fabrication troubles, high corrosion rate, cost. Flowsheet, tables, graphs. (T25, Be)

295-V. Bismuth. M. C. Udy. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 107-111.

Relatively low melting point and a low-absorption cross section of bismuth suggests its use as a liquid fuel-carrying medium in nuclear reactors or as a liquid-metal coolant. Tables. 2 ref. (T25, Bi)

296-V. Carbides. M. W. Mallett and V. M. Sheipline. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 113-122.

Used as refractories, fuels, radiation shields or structural materials. Most important properties of carbides are high hardness and good thermal stability. Tabulation of physical and chemical constants and preparation. Tables. (T25, C-n)

297-V. Lithium and Its Alloys. M. W. Mote and P. D. Frost. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 169-172.

Physical, chemical and mechanical properties. Refers to alloy properties. Table (Li)

298-V. Magnesium and Its Alloys. M. W. Mote and P. D. Frost. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 173-190.

This lightest of structural metals has a low neutron-absorption cross section but no present large-scale application. Alloys, mechanical, physical and metallurgical qualities. Tables. (Mg)

299-V. Molybdenum and Its Alloys. R. M. Parke, J. A. Van Echo, W. E. Few and L. E. Olds. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service. U. S. Atomic Energy Commission, p. 191-214.

Shows promise as a material of construction for high stress above 1600° F. Economic, physical, mechanical, metallurgical data. Tables, graphs. (T25, Mo)

300-V. Nickel and Its Alloys. D. J. Daniels and A. M. Hall. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 215-234.

The alloy strength, high-temperature strength, and corrosion resistance of nickel maintain its demand, despite a rather high neutron-absorption cross section. Properties are listed and described. Tables. (Ni)

301-V. Plutonium and Its Alloys. E. R. Lette and A. S. Coffinberry. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 235-242.

Only foreseeable applications are as weapon material and in reactors. Properties listed, health hazards discussed. Tables. 6 ref. (T2, T25, A7, Pu)

302-V. Rare Earths. M. C. Udy. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 243-254.

Metals are finding use as reactor

controls because of their unusually high neutron-absorption cross sections (up to 44,000 barns). Availability, applications, properties. Tables. 1 ref. (T25, EG-b)

303-V. Stainless Steels. Erwin Eichen, J. H. Jackson, W. K. Boyd and R. S. Peoples. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647, Technical Information Service, U. S. Atomic Energy Commission, p. 263-297.

Applications in nuclear technology which are quite extensive, because of their elevated temperature strength and good corrosion resistance. Physical, mechanical, metallurgical, corrosion properties. Tables, graphs. 1 ref. (T25, SS)

304-V. Titanium and Its Alloys. H. R. Ogden. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 345-372.

Quite similar to zirconium in properties, but with a higher neutron-absorption cross section, titanium demand is based on favorable strength-weight ratio. Presents metallurgical, physical, mechanical properties. Tables, graphs, flowsheet, diagrams. (T25, Ti)

305-V. Tungsten. R. B. Fischer. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 373-381.

Economics, physical, mechanical, metallurgical properties. Tables, graph. (W)

306-V. Uranium and Its Alloys. H. A. Saller. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 383-436.

This is the basic fuel for nuclear reactors and has few other uses. Its apparent scarcity is misleading. Details of its technology. Flowsheets, tables, graphs, diagrams, micrographs. (T25, U)

307-V. Vanadium and Its Alloys. J. R. Keeler. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 437-457.

Properties of this highly reactive, high-melting point metal and its alloys. May serve as a structural material in fast reactors. Tables, graphs, diagrams. (T26)

308-V. Zirconium and Its Alloys. R. W. Dayton. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 459-504.

Because of its nuclear properties, this metal, when free of hafnium, has extensive applications as a structural material in reactor design; the core of the first submarine thermal reactor is zirconium. Major limitations are loss of strength and corrosion resistance at high temperatures. Tables, graph. (T26, Zr)

309-V. High-Cross-Section Materials. M. C. Udy. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 505-531.

Technology of the metals boron, cadmium, cobalt, hafnium, mercury, rhodium and silver. Tables. (B, Cd, Co, Hf, Hg, Rh, Ag)

310-V. Cobalt-Base Alloys. Erwin Eichen and J. H. Jackson. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 533-557.

Cobalt alloys, the "superalloys" for stress and shock resistance at high temperature, find their niche in nuclear reactors despite cobalt's high termal-neutron absorption. Alloy characteristics are presented. Tables, graphs. (T25, Co, AY)

311-V. (English.) **Recent Advances in Aluminum Technology in the United States.** P. D. Frost, O. J. Huber and C. H. Lorig. Paper from "Congres International de l'Aluminium". v. II. La Société d'Edition et de Documentation des Alliages Légers, p. 185-195.

Important development in past two years, including the Alcoa office in Pittsburgh, heavy press program for aircraft, sintered powder, relationship between plastic properties of copper alloys and mean free path between particles of $CuAl_2$ disperse phase, high-strength alloys, bearing alloys, electrodeposition. Photographs, graphs, tables, diagram. 24 ref. (T general, Al)

312-V. (German.) **Thermal-Bimetals.** W. Rienäcker. *Schweizer Archiv für angewandte Wissenschaft und Technik,* v. 21, no. 9, Sept. 1955, p. 289-295.

Production of bimetals for technical application, composition, heat conductivity, corrosion prevention. Graphs, table. 10 ref. (SG-a)

313-V. Hiduminium RR.58. Heat Treatable Aluminum Alloy. *Alloy Digest,* no. Al-34, Nov. 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, spec-

ification equivalents, general characteristics, forms available, applications. (Al)

314-V. Ampco Metal-16. Aluminum Bronze. *Alloy Digest,* no. Cu-33, Nov. 1955.

Composition, physical constants, properties, machinability, weldability, corrosion resistance, general characteristics, forms available, applications. (Cu)

315-V. Dowmetal HK31XA. High Temperature Magnesium Alloy. *Alloy Digest,* no. Mg-20, Nov 1955.

Composition, physical constants, properties, heat treatment, machinability, weldability, specification equivalents, general characteristics, forms available, applications. (Mg)

316-V. AISI—E3310. Chromium-Nickel Carburizing Steel. *Alloy Digest,* no. SA-35, Nov. 1955.

Composition, properties, heat treatment, machinability, workability, weldability, specification equivalents, general characteristics, forms available, applications. (AY)

317-V. Carpenter Stainless No. 440B. High-Carbon Chromium Stainless Steel, Type 440B. *Alloy Digest,* no. SS-36, Nov. 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance, pickling treatment, specification equivalents, general characteristics, forms available, applications. (SS)

318-V. U.S.S. 9% Cr-1% Mo. Corrosion Resistant Steel. *Alloy Digest,* no. SS-37, Nov. 1955.

Composition, physical constants, properties, heat treatment, machinability, workability, weldability, corrosion resistance, specification equivalents, general characteristics, forms available, applications. (SS)

319-V. Rem-Cru A-110AT. High-Strength Titanium Alloy. *Alloy Digest.* no. Ti-8, Nov. 1955.

Composition, physical constants, properties, fatigue strength, heat treatment, machinability, corrosion resistance, cleaning, workability, weldability, general characteristics, forms available, applications. Graphs. (Ti)

320-V. N Graph-Mo. Graphitic Tool & Die Steel. *Alloy Digest,* no. TS-40, Nov. 1955.

Composition, properties, heat treatment, machinability, grinding, workability, general characteristics, forms available, applications. (TS)

321-V. How to Work Superalloys. Anderson Ashburn. *American Machinist,* v. 99, Oct. 24, 1955, p. 137-144.

Data on properties, heat treatment, forging, welding and machining tabulated for 34 alloys. Tables, graph, diagrams. (Q general, J general, F22, K general, G17, SG-h)

322-V. Thorium and its Alloys. J. R. Keeler. Paper from "The Reactor Handbook. v. III. Materials". AECD-3647. Technical Information Service, U. S. Atomic Energy Commission, p. 299-344.

Interest in thorium is based on its being a source of uranium^{233}. Physical, mechanical, metallurgical properties presented. Tables, graphs. (Th)

323-V. (Pamphlet.) **Titanium.** 16 p. 1955. U. S. Government Printing Office, Superintendent of Documents, Washington, D. C.

Staff report of a special senate subcommittee on minerals, materials. and fuels economics regarding recent experiences of titanium producers and fabricators. (Ti)

324-V. (Book.) **Zirconium & Hafnium.** A Bibliography. Gordon C. Williams, E. G. Baker, Jr., E. W. Holzknecht and R. G. Moody. NYO-1008. 236 p. 1950. U. S. Atomic Energy Commission, Technical Information Service, Oak Ridge, Tenn.

Covers articles appearing in *Chemical Abstracts* from 1907 through 1948. (Zr, Hf)

ADDRESSES OF PUBLICATIONS

I. ENGLISH LANGUAGE JOURNALS

A

Acoustical Society of America, Journal, American Institute of Physics, Prince and Lemon Sts., Lancaster, Pa., or 57 East 55th St., New York 22, N. Y.

Acta Metallurgica, 57 East 55th St., New York 22, N. Y.

Acta Radiologica, P. A. Norstedt and Stoner, Stockholm, Sweden.

Adhesives & Resins, A. S. O'Connor & Co., Ltd., 329 Gray's Inn Road, London, W. C. 1, England.

Advances in Physics, Taylor & Francis Ltd., Red Lion Court, Fleet St., London, E. C. 4, England.

Aero Digest, Aeronautical Digest Publishing Corp., 515 Madison Ave., New York 22, N. Y.

Aeronautical Engineering Review, Institute of Aeronautical Sciences, Inc., 2 East 64th St., New York 21, N. Y. or 7660 Beverly Blvd., Los Angeles, Calif.

Aeronautical Quarterly, Royal Aeronautical Society, 4 Hamilton Place, London, W. 1, England.

Aeronautical Research Institute of Sweden, Report, Stockholm, Sweden.

Aeronautics, British Aviation Publications Ltd., Tower House, Southampton St., Strand, London, W. C. 2, England.

Air Conditioning, Heating and Ventilating, The Industrial Press, 148 Lafayette St., New York 13, N. Y.

Aircraft Engineering, Bunhill Publications Ltd., 12 Bloomsbury Square, London, W. C. 1, England.

Aircraft Production, Iliffe & Sons Ltd., Dorset House, Stamford St., London, S. E. 1, England.

Air Repair, Air Pollution Control Association, 4400 Fifth Ave., Pittsburgh 13, Pa.

Alabama Polytechnic Institute, Engineering Experiment Station, Engineering Bulletin, Auburn, Ala.

Alloy Digest, Engineering Alloys Digest Inc., P. O. Box 156, Upper Montclair, N. J.

Alloy Metals Review, High Speed Steel Alloys Ltd., Widnes, Lancashire, England.

Aluminium Courier, Aluminium Development Association, 33 Grosvenor St., London, W. 1, England.

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American Ceramic Society Bulletin, 4055 N. High St., Columbus 2, Ohio.

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American Cyanamid Co., Mineral Dressing Notes, 30 Rockefeller Plaza, New York 20, N. Y.

American Electroplaters' Society, Proceedings, 445 Broad St., Newark 2, N. J.

American Foundryman, American Foundrymen's Society Inc., Golf & Wolf Roads, Des Plaines, Ill.

American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Conference, Preprint, 29 West 39th St., New York 18, N. Y.

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American Paint Journal, 2911 Washington Ave., St. Louis 3, Mo.

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Australian Journal of Applied Science, The Editor, Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C 2 Australia.

Atomics, (British), Leonard Hill Ltd., 9 Eden St., London, N. W. 1, England.

Automatic Machining, Screw Machine Publishing Co., Inc., 65 Broad St., Rochester 14, N. Y.

Automation, Penton Publishing Co., Penton Building, Cleveland 13, Ohio.

Automobile Engineer, Iliffe & Sons Ltd., Dorset House, Stamford St., London, S. E. 1, England.

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Aviation Age, Conover-Mast Publications Inc., 205 E. 42nd St., New York 17, N. Y.

Aviation Week, 330 West 42nd St., New York 36, N. Y. or 99-129 N. Broadway, Albany 1, N. Y.

B

Battelle Technical Review, Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

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C

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California University, Institute of Engineering Research, University of California, Berkeley, Calif.

Canada Department of Mines and Technical Surveys, Mines Branch Research Report, Division of Administration, National Research Council, Ottawa 2, Ont. Canada.

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Canadian Metals, Hugh C. Maclean Publications Ltd., Box 4000, Terminal A, Toronto 1, Ont. Canada.
Canadian Mining and Metallurgical Bulletin, Canadian Institute of Mining and Metallurgy, 911 Drummond Building, Montreal, Quebec, Canada.
Canadian Mining Journal, Gardenvale, Quebec, Canada.
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Ceramics, Arrow Press Ltd., 1 Stamford St., London, S. E. 1, England.
Chartered Mechanical Engineer, Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, S. W. 1, England.
Chemical Age, Benn Brothers Ltd., Bouverie House, 154 Fleet St., London, E. C. 4, England.
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Chemical and Engineering News, American Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C.
Chemical Engineering Progress, F. J. Van Antwerpen, American Institute of Chemical Engineers, 120 East 41st St., New York 17, N. Y.
Chemical Processing, 111 East Delaware Place, Chicago 11, Ill.
Chemical & Process Engineering, Leonard Hill Ltd., Stratford House, 9 Eden St., London, N. W. 1, England.
Chemical Society, Journal, Burlington House, London, W. 1, England.
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Chemistry & Industry, Society of Chemical Industry, 56 Victoria St., London, S. W. 1, England.
Chemistry in Canada, Chemical Institute of Canada, 18 Rideau St., Ottawa, Ont. Canada.
Colorado School of Mines, Quarterly, Golden, Colo.
Combustion, Combustion Publishing Co., Inc., 200 Madison Ave., New York 16, N. Y.
Commonwealth of Australia, Department of Supply, Defence Standards Laboratories Report, Department of Supply, Melbourne, Australia.
Commonwealth of Australia, Department of Supply, Research and Development Branch, Department of Supply, Melbourne, Australia.
Communication and Electronics, American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.
Consulting Engineer, Industry and Power Publishing Co., 420 Main St., St. Joseph, Mich.
Copper & Brass Bulletin, Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y.
Corrosion, National Association of Corrosion Engineers, 1061 M & M Building, No. 1 Main St., Houston 2, Tex.
Corrosion Prevention and Control, Holland House, 140 Cromwell Road, London, S. W. 7, England.
Corrosion Technology, Technology Publications Ltd., Stratford, House, 9 Eden St., London, N. W. 1, England.
Council of Scientific and Industrial Research, Alagappo College P. O., Karaikudi, S. Ry., India.

D

Diesel Power, Diesel Publications Inc., 192 Lexington Ave., New York 16, N. Y.
Discovery, Jarrold & Sons Ltd., Norwich, England.
Dun's Review and Modern Industry, Dun & Bradstreet Publications, 300 W. Adams St., Chicago 90, Ill.

E

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Electrochemical Society, Journal, 216 West 102nd St., New York 25, N. Y.
Electronic Engineering, 28 Essex St., Strand, London, W. C. 2, England.
Electronics, Taylor & Francis Ltd., Red Lion Court, Fleet St., London, E. C. 4, England.
Electroplating and Metal Finishing, 85

Udney Park Rd., Teddington, Middlesex, England.

Electrotypers and Stereotypers, Journal, Stonhill & Gillis Ltd., 329 High Holborn, London, W. C. 1, England.

Endeavour, Imperial Industries Ltd., North Block, Thames House, Millbank, London, S. W. 1, England.

Engineer, Morgan Brothers Ltd., 28 Essex St., Strand, London, W. C. 2, England.

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Engineering Journal, Engineering Institute of Canada, 2050 Mansfield St., Montreal St., Montreal, Quebec, Canada.

Engineering and Mining Journal, 1309 Noble St., Philadelphia 23, Pa., or 330 West 42nd St., New York 36, N. Y.

Engineering News-Record, McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y.

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Edgar Allen News, Edgar Allen Steel Co. Div., A. Milne & Co., 741-3-5 Washington St., New York, N. Y.

F

Factory Management and Maintenance, 330 West 42nd St., New York 36, N. Y.

Faraday Society, Transactions, Aberdeen University Press Ltd., 6 Upper Kirkgate, Aberdeen, England.

Finish, Dana Chase Publications, York Street and Park Ave., Elmhurst, Ill.

Flow, 1240 Ontario St., Cleveland 13, Ohio.

Food Technology, Institute of Food Technology, 176 W. Adams St., Chicago 3, Ill.

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Franklin Institute, Journal, Franklin Institute of the State of Pennsylvania, Benjamin Franklin Parkway at 20th, Philadelphia 3, Pa.

Frontier, Armour Research Foundation, Illinois Institute of Technology, Technology Center, Chicago 16, Ill.

G

Gas, Jenkins Publications Inc., 198 S. Alvarado St., Los Angeles 57, Calif.

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General Motors Engineering Journal, Educational Relations Section, Department of Public Relations, GM Technical Center, P. O. Box 177, North End Station, Detroit 2, Mich.

Government Mechanical Laboratory, Sumiyoshi-Cho Suginami-Ku, Tokyo, Japan.

H

Heating & Air Conditioning, Contractor, Edwin A. Scott Publishing Corp., 92 Martling Ave., Tarrytown, N. Y.

Heating, Piping & Air Conditioning, Keeney Publishing Co., 6 N. Michigan Ave., Chicago 2, Ill.

I

Indian Institute of Metals, Transactions, 31, Chowringhee Road, Calcutta 16, India.

Indian Institute of Science, Journal, Bangalore 3, India.

Industrial Chemist and Chemical Manufacturer, Tothill Press Ltd., 33 Tothill St., Westminster, London, S. W. 1, England.

Industrial and Engineering Chemistry, American Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C.

Industrial Finishing, Practical Publications Inc., 1142 N. Meridian St., Indianapolis 4, Ind.

Industrial Finishing (London), Arrow Press Ltd., 1 Stamford St., London, S. E. 1, England.

Industrial Gas, Moore Publishing Co., Inc., Emmett St., Bristol, Conn.

Industrial Heating, National Industrial Publishing Co., Union Trust Building, Pittsburgh 19, Pa.

Industrial Packaging, Haywood Publishing Co., 22 E. Huron St., Chicago 11, Ill.

Industry & Welding, Industrial Publishing Group, 1240 Ontario St., Cleveland 13, Ohio.

Institut de Recherches de la Sidérurgie, Publications, Marcelle Bonnevialle, 25, Rue de Clichy, Paris (IX^{e}), France.

Institute of Fuel, Journal, Institute of Fuel, 18 Devonshire St., Portland Place, London, W. 1, England.

Institute of Industrial Science, Report, University of Tokyo, Chiba City, Japan.

Institute of Marine Engineers, Transactions, 85 Minories, London, E. C. 3, England.
Institute of Metal Finishing, Bulletin, 32 Great Ormond St., London, W. C. 1, England.
Institute of Metal Finishing, Transactions, Advanced Copy, 32 Great Ormand St., London, W. C. 1, England.
Institute of Metallurgists, 4 Grosvenor Gardens, London S. W., England.
Institute of Metals, Bulletin, 4 Grosvenor Gardens, London, S. W. 1, England.
Institute of Metals, Journal, 4 Grosvenor Gardens, London, S. W. 1, England.
Institute of Petroleum, Journal, 26 Portland Place, London, W. 1, England.
Institute of Radio Engineers, Transactions on Industrial Electronics, 1 East 79th St., New York 21, N. Y.
Institute of Radio Engineers, Transactions of the I.R.E. Professional Group, 1 East 79th St., New York 21, N. Y.
Institution of Chemical Engineers, Transactions, 56 Victoria St., London, S. W. 1, England.
Institution of Electrical Engineers, Proceedings, Savoy Place, London, W. C. 2, England.
Institution of Mechanical Engineers, Automobile Division, Proceedings, 1 Birdcage Walk, Westminster, S. W. 1, England.
Institution of Mechanical Engineers, Proceedings, 1 Birdcage Walk, Westminster, S. W. 1, England.
Instrumentation, Minneapolis - Honeywell Regulator Co., Industrial Division, Wayne and Windrim Aves., Philadelphia 44, Pa.
Instruments and Automation, Instruments Publishing Co., Inc., 845 Ridge Ave., Pittsburgh 12, Pa.
Interchemical Review, Research Laboratories of Interchemical Corp., 432 West 45th St., New York 36, N. Y.
Iron Age, Chilton Co., Inc., 100 East 42nd St., New York 17, N. Y.
Iron & Steel, Louis Cassier Co., Ltd., Dorset House, Stamford St., London, S. E. 1, England.
Iron and Steel Engineer, Association of Iron and Steel Engineers, 1010 Empire Building, Pittsburgh 22, Pa.
Iron and Steel Institute, Journal, 4 Grosvenor Gardens, London, S. W. 1, England.
Iron and Steel Institute; Papers of the Affiliated Local Societies, Special Report, 4 Grosvenor Gardens, London, S. W. 1, England.
Iron and Steel Institute, Preprints of Symposium Papers, 4 Grosvenor Gardens, London, S. W. 1, England.
ISA Journal, Instrument Society of America, 1319 Allegheny Ave., Pittsburgh 33, Pa.
INCO, International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

J

Jet Propulsion, American Rocket Society, 500 Fifth Ave., New York 36, N. Y.
Journal of the Aeronautical Sciences, Institute of the Aeronautical Sciences Inc., 2 East 64th St., New York 21, N. Y.
Journal of Agricultural and Food Chemistry, American Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C.
Journal of Applied Chemistry, Society of Chemical Industry, 56 Victoria St., London, S. W. 1, England.
Journal of Applied Mechanics, American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y.
Journal of Applied Physics, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Journal of Chemical Physics, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Journal of Glass Technology, "Thornton," Hallam Gate Rd., Sheffield 10, England.
Journal of Industrial Economics, Basil Blackwell, Broad St. Oxford, England.
Journal of Inorganic and Nuclear Chemistry, Pergamon Press Ltd., 4 & 5 Fitzroy Square, London, W. 1, England, or 122 East 55th St., New York 22, N. Y.
Journal of the Mechanics and Physics of Solids, Pergamon Press Ltd., 4 & 5 Fitzroy Square, London, W. 1, England, or 122 East 55th St., New York 22, N. Y.
Journal of Metals, Metals Branch, American Institute of Mining and Metallurgical Engineers Inc., 29 West 39th St., New York 18, N. Y.
Journal of Nuclear Energy, L. R. Maxwell & Co., Ltd., 4 & 5 Fitzroy Square, London, W. 1, England, or Pergamon Press Inc., 122 East 55th St., New York 22, N. Y.
Journal of Petroleum Technology, Petroleum Branch, American Institute of Mining and Metallurgical Engineers, 800 Fidelity-Union Bldg., Dallas 1, Tex.
Journal of Physical Chemistry, American

Chemical Society, 1155 Sixteenth St., N. W., Washington 6, D. C.

Journal of Rational Mechanics and Analysis, Graduate Institute for Applied Mathematics and Mechanics, Indiana University, Bloomington, Ind.

Journal of Research, National Bureau of Standards, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Journal of the Science of Food and Agriculture, Society of Chemical Industry, 56 Victoria St., London, S. W. 1, England.

Journal of Scientific & Industrial Research, Council of Scientific & Industrial Research, New Delhi, India.

Journal of Scientific Instruments, Institute of Physics, 47 Belgrave Square, London, S. W. 1, England.

L

Laboratory Practice, United Trade Press Ltd., 9, Gough Square, Fleet St., London, E. C. 4, England.

Light Metal Age, 220 S. State St., Chicago 4, Ill.

Light Metals, Temple Press Ltd., Bowling Green Lane, London, E. C. 1, England.

Linde Tips, Linde Air Products Co., 30 East 42nd St., New York 17, N. Y.

Lubrication, The Texas Company, 135 East 42nd St., New York 17, N. Y.

Lubrication Engineering, American Society of Lubrication Engineers, 84 E. Randolph St., Chicago 1, Ill.

M

Machine and Tool Blue Book, Hitchcock Publishing Co., 222 E. Willow Ave., Wheaton, Ill.

Machine Design, Penton Publishing Co., Penton Building, Cleveland 13, Ohio.

Machinery, 148 Lafayette St., New York 13, N. Y.

Machinery (London), Machinery Publishing Co., Ltd., Clifton House, 83-117 Euston Rd., London, N. W. 1, England.

Machinery Lloyd (Overseas Ed.), Continental & Overseas Organisation Ltd., 6 Cavendish Place, Regent St., London, W. 1, England.

Magnesium, Brooks and Perkins Inc., 1950 W. Fort St., Detroit 16, Mich.

Mainspring, Associated Spring Corporation, Bristol, Conn.

Marine Engineering, 30 Church St., New York 7, N. Y., or 70 W. Monroe St., Chicago 3, Ill.

Materials & Methods, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

Mechanical Engineering, American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y.

Mechanical Topics, International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

Mechanical World and Engineering Record, Emmott & Co., Ltd., 31 King St. West, Manchester 3, England, or 50 Temple Chambers, Temple Ave., London, E. C. 4, England.

Metal Finishing, Finishing Publications Inc., 381 Broadway, Westwood, N. J.

Metal Industry, Louis Cassier Co., Ltd., Dorset House, Stamford St., London, S. E. 1, England.

Metal Powder Association, Proceedings, 420 Lexington Ave., New York 17, N. Y.

Metal Progress, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Metal Treating, Metal Treating Institute, 271 North Ave., New Rochelle, N. Y.

Metal Treatment and Drop Forging, Industrial Newspapers Ltd., John Adam House, 17/19 John Adam St., Adelphi, London, W. C. 2, England.

Metallurgia, The Kennedy Press Ltd., 31 King St. West, Manchester 3, England.

Metal-Working, Sutton Publishing Co., Inc., 172 S. Broadway, White Plains, N. Y.

Metalworking Production, McGraw Hill Publishing Co., Ltd., 95 Farrington St., London, E. C. 4, England.

Mine and Quarry Engineering, Tothill Press Ltd., 33 Tothill St., London, S. W. 1, England.

Mines Magazine, Colorado School of Mines Alumni Association, Frank C. Bowman, Editor, 734 Cooper Bldg., Denver 2, Colo.

Mining Congress Journal, American Mining Congress, Ring Building, Washington 6, D. C.

Mining Engineering, American Institute of Mining and Metallurgical Engineers, 29 West 39th St., New York 18, N. Y.

Mining Journal, 15 Wilson St., Moorgate, London, E. C. 2, England.

Mining Magazine, Mining Publications Ltd., 482 Salisbury House, London Wall, London, E. C. 2, England.

Mining World, 121 Second St., San Francisco 5, Calif.

Modern Castings and American Foundryman, American Foundrymen's Society Inc., Golf & Wolf Roads, Des Plaines, Ill.

Modern Machine Shop, Gardner Publications Inc., 431 Main St., Cincinnati 2, Ohio.

Modern Metals, Modern Metals Publishing Co., 435 N. Michigan Ave., Chicago 11, Ill.

Modern Packaging, 575 Madison Ave., New York 22, N. Y.

Modern Plastics, Breskin Publications Inc., 575 Madison Ave., New York 22, N. Y.

Monthly Business Review, Federal Reserve Bank of Cleveland, Cleveland 1, Ohio.

N

National Bureau of Standards Technical News Bulletin, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Nature, Macmillan & Co., Ltd., St. Martin's St., London, W. C. 2, England, or St. Martin's Press Inc., 103 Park Ave., New York 17, N. Y.

New York Academy of Sciences, Transactions, 2 East 63rd St., New York 21, N. Y.

News in Engineering at Ohio State University, 306 B Engineering Experiment Station, The Ohio State University, Columbus 10, Ohio.

Nondestructive Testing, Editor, Nondestructive Testing, 1109 Hinman Ave., Evanston, Ill.

North East Coast Institution of Engineers & Shipbuilders, Transaction, Newcastle upon Tyne, England.

Nucleonics, McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 36, N. Y.

O

Official Digest. Federation of Paint and Varnish Production Clubs, Stockerton Rd., Easton, Pa.

Ohio Journal of Science, Ohio State University, Columbus 10, Ohio.

Oil and Gas Journal, Petroleum Publishing Co., P. O. Box 1260, Tulsa, Okla.

Optical Society of American Journal, American Institute of Physics, 57 East 55th St., New York 22, N. Y.

Ordnance, American Ordnance Association, 708 Mills Building, Washington 6, D. C.

Organic Finishing, Finishing Publications Inc., 381 Broadway, Westwood, N. J.

P

Paint Industry Magazine, Heckel Publishing Co., Inc., 1321 Arch St., Philadelphia 7, Pa.

Paint Manufacture, Leonard Hill Ltd., Stratford House, 9 Eden St., London, N. W. 1, England.

Paint Technology, 58 College Rd., Harrow, Middlesex, England.

Paint and Varnish Production, Powell Magazine Inc., 855 Ave. of America, New York 1, N. Y.

Paper, Film, and Foil Converter, Howard Publishing Co., 111 W. Washington St., Chicago 2, Ill.

Paper Mill News, L. D. Post Inc., 1440 Broadway, New York 18, N. Y.

PERA, Production Engineering Research Association of Great Britain, Melton Mowbray, Leicestershire, England.

Petroleum, Svenska Esso Aktiebolag, Box 7056, Stockholm 7, Sweden.

Petroleum Engineer, The Petroleum Engineer Publishing Co., 15th Floor, 1700 Commerce St., Dallas 1, Tex.

Petroleum Refiner, The Gulf Publishing Co., Box 2608, Houston 1, Tex.

Philips Research Reports, N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands.

Philips Technical Review, N. V. Philips' Gloeilampenfabrieken, Technical and Scientific Literature Dept., Eindhoven, Netherlands.

Philosophical Magazine, Editors, c/o Messrs. Taylor and Francis Ltd., Red Lion Court, Fleet St., London, E. C. 4, England.

Physical Review, American Institute of Physics, 57 East 55th St., New York 22, N. Y.

Physical Society of Japan, Journal, c/o Department of Physics, Faculty of Sciences, University of Tokyo, Bunkyo-ku, Tokyo, Japan.

Physical Society, Proceedings, 1 Lowther Gardens, Prince Consort Rd., London, S. W. 7, England.

Pipe Line Industry, Gulf Publishing Co., P. O. Box 2608, Houston 1, Tex.

Pipe Line News, Oildom Publishing Co. 101 W. Alabama, Houston, Tex.

Plastics, Temple Press Ltd., Bowling Green Lane, London, E. C. 1, England.
Plating, American Electroplaters' Society, American Building, 445 Broad St., Newark 2, N. J.
Powder Metullurgy Bulletin, Dr. Paul Schwarzkoff, President, American Electro Metal Corp., 320 Yonkers Ave., Yonkers 2, N. Y.
Power, 330 West 42nd St., New York 36, N. Y.
Power Apparatus and Systems, American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.
Precision Metal Molding, Industrial Publishing Group, Div. of Telenews Productions Inc. 1240 Ontario St., Cleveland 13, Ohio.
Product Engineering, 99-129 N. Broadway, Albany 1, N. Y., or 330 West 42nd St., New York 36, N. Y.
Product Finishing, Sawell-Publications Ltd., 4 Ludgate Circus, London, E. C. 4, England.
Products Finishing, Gardner Publications Inc., 431 Main St., Cincinnati 2, Ohio.
Pulp & Paper, 121 Second St., San Francisco, Calif.
Photographic Science and Technique, Photographic Society of America, 2005 Walnut St., Philadelphia 3, Pa.

Q

Quarterly of Applied Mathematics, Brown University, Providence 12, R. I.
Quarterly Journal of Mechanics and Applied Mathematics, Geoffrey Cumberlege, Oxford University Press, Amen House, London, E. C. 4, England.

R

Railway Age, Robert G. Lewis, Vice President, 30 Church St., New York 7, N. Y.
Railway Gazette, 33 Tothill St., Westminister, London, SW. 1, England.
Railway Locomotives and Cars, Robert G. Lewis, Vice President, 30 Church St., New York 7, N. Y.
Refractories Journal, London and Sheffield Publishing Co., Ltd., 7 Chesterfield Gardens, Curzon St., Mayfair, London, W. 1, England.
Refrigerating Engineering, American Society of Refrigerating Engineers, 234 Fifth Ave., New York 1, N. Y.
Rem-Cru Titanium Reviews, Midland, Pa.
Research, Butterworth Scientific Publications, 88 Kingsway, London, W. C. 2, England.
Review of Scientific Instruments, American Institute of Physics, 57 East 55th St., New York 22, N. Y.
Reviews of Pure and Applied Chemistry, Royal Australian Chemical Institute, Kelvin Hall, 55 Collins Place, Melbourne, Australia.
Rock Products, MacLean-Hunter Publishing Corp., 309 W. Jackson Blvd., Chicago 6, Ill.
Royal Aeronautical Society, Journal, 4 Hamilton Place, London, W. 1 England.
Royal Microscopical Society, Journal, Tavistock House South, Tavistock Square, London, W. C. 1, England.
Royal Society of London, Philosophical Transactions, Burlington House, Piccadilly, London, N. W. 1, England.
Royal Society Proceedings, Burlington House, Piccadilly, London, W. 1, England.
Rubber World, Bill Brothers Publishing Corp., 1309 Noble St., Philadelphia, Pa.

S

SAAB Aircraft Company, Technical Notes, Svenska Aeroplan Aktiebolaget, SAAB Aircraft Co., Linköping, Sweden.
SAE Journal, Society for Automotive Engineers Inc., 29 West 39th St., New York 18, N. Y.
Science Reports of the Research Institute, Tohoku University, Sendai, Japan.
Scientific American, 2 West 45th St., New York 36, N. Y.
Scientific Lubrication, Scientific Publications, Broseley, Shropshire, England.
Screw Machine Engineering, Screw Machine Publishing Co., 65 Broad St., Rochester 14, N. Y.
Sewage and Industrial Wastes, Federation of Sewage and Industrial Wastes Association, 325 Illinois Building, Champaign, Ill.
Sheet Metal Industries, Industrial Newspapers Ltd., John Adam House, 17/19 John Adam St., Adelphi, London, W. C. 2, England.
Shell Aviation News, St. Helens Court, Great St. Helens, London, E. C. 3, England.
Society for Industrial and Applied Mathematics, Journal, Ruth A. Applegate,

Business Manager, Journal, P. O. Box 7541, Philadelphia 1, Pa.
South African Mining and Engineering Journal, Balgownie House, 66 Commissioner St., Johannesburg, Union of South Africa.
Southern Pulp and Paper Manufacturer, 75 Third St., N. W., Atlanta 8, Ga.
Steel, Penton Publishing Co., Penton Building, Cleveland 13, Ohio.
Steel Equipment & Maintenance News, 528 Washington Road, Pittsburgh 28, Pa.
Steel Founders' Society of America Research Report, 606 Terminal Tower, Cleveland 13, Ohio.
Steel Horizons, Allegheny Ludlum Steel Corp., Oliver Building, Pittsburgh 22, Pa.
Steel Processing, Steel Publications Inc., 4 Smithfield St., Pittsburgh 30, Pa.
Stove and Appliance Builder, Institute of Appliance Manufacturers, Shoreham Hotel, Washington 8, D. C.
Sylvania Technologist, Jerome R. Steen, Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

T

Tappi, Technical Association of the Pulp and Paper Industry, 122 East 42nd St., New York 17, N. Y.
Technology Reports, Tohoku University, Faculty of Engineering, Sendai, Japan.
Tele-Tech, Caldwell Clements Inc., 480 Lexington Ave., New York 17, N. Y.
Tele-Tech & Electronic Industries, Caldwell Clements Inc., 480 Lexington Ave., New York 17, N. Y.
Times Review of Industry, The Editor, Printing House Square, London, E. C. 4, England
Times Science Review, Subscription Manager, The Times, London, E. C. 4, England.
Tin and Its Uses, International Tin Study Group, 7 Carel van Bylandtlaan, The Hague, Netherlands.
Tool Engineer, American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38, Mich.
Tooling and Production, Huebner Publications Inc., 1975 Lee Rd., Cleveland 18, Ohio.
Trend in Engineering (University of Washington), Director Engineering Experiment Station, University of Washington, Seattle 5, Wash.

U

U. S. Atomic Energy Commission: For all reports prepared for U. S. Atomic Energy see Nuclear Science Abstracts for availability.
U. S. Bureau of Mines, Information Circular, U. S. Department of Interior, Washington, D. C.
U. S. Bureau of Mines, Report of Investigations, U. S. Department of Interior, Washington, D. C.
U. S. Department of Agriculture, Forest Products Laboratory, Report, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
U. S. Department of Commerce, Technical Division Reports, Office of Technical Services, Washington 25, D. C.
U. S. National Advisory Committee for Aeronautics, Report, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
U. S. National Advisory Committee for Aeronautics, Research Memorandum, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
U. S. National Advisory Committee for Aeronautics, Technical Note, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
U. S. National Bureau of Standards Circular, Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.
Utilization, Mechanization Inc., Washington, D. C.

V

Vacuum, W. Edwards & Co., Ltd., Worsley Bridge Rd., Lower Sydenham, London, S. E. 26, England.
Virginia Polytechnic Institute, Bulletin, Engineering Experiment Station Series, Virginia Polytechnic Institute, Blacksburg, Va.

W

Water & Sewage Works, 155 East 44th St., New York 17, N. Y.

Welder, Murex Welding Processes Ltd., Waltham Cross, Herts, England.

Welding Engineer, J. E. Blackburn, Jr., Director of Circulation, 871 Franklin St., Chicago 10, Ill. or 330 West 42nd St., New York 36, N. Y.

Welding Journal, American Welding Society, 33 West 39th St., New York 18, N. Y.

Welding and Metal Fabrication, Louis Cassier Co., Ltd., Dorset House, Stamford St., London, S. E. 1, England.

Welding Research, Institute of Welding, 2 Buckingham Palace Gardens, London, S. W. 1, England.

Western Machinery and Steel World, 681 Market St., San Francisco 5, Calif., or 8943 Wilshire Blvd., Beverly Hills, Calif.

Western Metals, Jenkins Publications Inc., 198 S. Alvarado St., Los Angeles 5, Calif.

Western Union Technical Review, Western Union Telegraph Co., Committee on Technical Publication, 60 Hudson St., New York 13, N. Y.

Westinghouse Engineer, P.O. Box 2278, 3 Gateway Center, Pittsburgh 30, Pa.

Wild-Barfield Heat-Treatment Journal, 4 Paradise Square, Sheffield 1, England.

Wire Industry, 33 Furnival St., London, E. C. 4, England.

Wire and Wire Products, 453 Main St., Stamford, Conn.

World Oil, Gulf Publishing Co., 3301 Buffalo Dr., Houston 6, Tex.

II. FOREIGN LANGUAGE PERIODICALS

The journals listed here are limited to those published in foreign languages. Foreign publications in English, such as those of Australia, India and certain Japanese journals, are listed in Section 1. English-Language Journals and Serials.

Most of the foreign journals (except Russian) are available through Stechert-Hafner, Inc., 31 E. 10th St., New York 3, N. Y. The Russian journals can be ordered from Four Continent Book Corp., 38 W. 58th St., New York 16, N. Y.

The addresses listed here follow the style used by the country of origin and also the language of origin, except for the country itself, which is given in English. Exact adherence to the style shown for addressing envelopes will greatly facilitate mail deliveries. In some countries (Germany, Austria, Russia) the name of the city precedes the street address. In these instances the name of the city is underlined to avoid confusion with the street address.

A

ABM (Boletim de associação brasileira da metais)
Viaduto Dona Paulina, 80
8 andar (Palácio Mauá)
Sao Paulo
Brazil

Acier, Stahl, Steel
Le Centre Belgo-Luxembourgeois d'Information de l'Acier
47, rue Montoyer
Bruxelles
Belgium

Aciers Fins & Spéciaux Francais
La Chambre Syndicale des Producteurs d'Aciers Fins et Spéciaux
12, Rue de Madrid
Paris (VIII)
France

Acta Chemica Scandinavica
Messrs. Einar Munksgaard
Nörregade 6
Copenhagen
Denmark

Acta Chimica Academiae Scientiarum Hungaricae
"Kultúra" Könyv és Hírlap Külkereskedelmí Vállalat
Acta Chimica
Budapest, VI, Sztálin-út 21.
Hungary

Acta Physica Academiae Scientiarum Hungaricae
"Kultúra" Könyv és Hírlap Külkereskedelmí Vállalat
Acta Physica
Budapest, VI, Sztálin-út 21.
Hungary

Acta Technica Academiae Scientiarum Hungaricae
"Kultúra" Könyv és Hírlap Külkereskedelmí Vállalat
Acta Technica
Budapest, VI, Sztálin-út 21
Hungary

Alluminio
Instituto Sperimentale dei Metalli Leggeri
Milano
via della Posta 8/10
Italy

Aluminium
Aluminium-Verlag G.m.b.H.
Düsseldorf
Jägerhofstrasse 26/29
Germany

Aluminium Suisse
A. G. Fachschriften-Verlag & Buchdruckerei
Stauffacherquai 40
Zürich 4
Switzerland

Annalen der Physik
Johann Ambrosius Barth
Leipzig C 1
Salomonstrasse 18 B
Germany

Annales de Chimie (Paris)
Masson et Cie., Éditeurs
120, Boulevard Saint-Germain
Paris (VI)
France

Annales de physique
Masson et Cie., Éditeurs
Librairie de l'Académie de Médecine
120, Boulevard Saint-Germain
Paris (VI)
France

Archiv für das Eisenhüttenwesen
Verlag Stahleisen G.m.b.H.
Düsseldorf
Breite Strasse 27
Germany

Archiv für technisches Messen
R. Oldenbourg Verlag
München 8
Rosenheimer Strasse 145
Germany

Archiwum Górnictwa i Hutnictwa
Warszawa 1, Krakowskie
Przedmiescie 79, Skrytka
Pocztowa 455
(Warsaw, Poland)

Arcos
58-62, rue des Deux-Gares
Bruxelles
Belgium

Arkiv för Fysik
Almqvist & Wiksells Boktryckeri AB
Stockholm
Sweden

Avtomobil'naia i traktornaia promyslennost'
Mashgiz
Leningrad, Ul. Moiseenko 10
(Leningrad, U.S.S.R.)

B

Bányászati Lapok
Nehézipair Könyv- és Folyóiratkiadó Vállalat
Budapest, V, Vadasz utca 16
Hungary

Bedrijf en Techniek
N. V. Uitgeversmij Diligentia
Kalverstraat 35
Amsterdam C
Holland

Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben
Springer-Verlag
Wien I
Mölkerbastei 5
Austria

Bitumen, Terre, Asphalte, Peche
Chemie und Technik Verlagsgesellschaft m.b.H.
Heidelberg (17a)
Germany

Biuletyn Informacyjny, Instytutow Ministerstwa Hutnictwa
Stalinogród, Ul. Opolska 22
Poland

Brennstoff-Chemie
Verlag W. Girardet
Essen
Germany

Brennstoff-Wärme-Kraft
Deutscher Ingenieur-Verlag G.m.b.H.
Düsseldorf
Ingenieurhaus, Prinz-Georg-Strasse 77/79
Germany

Bulletin de la société chimique de France
Masson et Cie., Depositaires
Libraires de l'Académie Médecine
120, Boulevard Saint-Germain
Paris (VI)
France

C

Centre Belge d'Etude de la Corrosion, Rapport Technique
2, Rue A. Stévart
Liége
Belgium

Centre Belge d'Etude et de Documentation des Eaux Bulletin
2 Rue A. Stévart
Liége
Belgium

Centre de Documentation Sidérurgique, Circulaire d'Informations Techniques
Centre de Documentation Sidérurgique
6, Rue de Lota
Paris (XVI)
France

Chemie-Ingenieur-Technik
Verlag Chemie, G.m.b.H.
(17a) Weinheim/Bergstrasse
Pappelallee 3
Germany

Chemische Industrie
Verlag Handelsblatt G.m.b.H.
Düsseldorf
Pressehaus
Germany

Chemische Technik
Verlag Technik
Berlin NW 7
Unter den Linden 12
Germany

Chimia
Buchdruckerei H. R. Sauerländer & Co.
Aarau
Switzerland

Ciencia y técnica de la Soldadura
Instituto de la Soldadura
Goya, 58
Madrid
Spain

Collection of Czechoslovak Chemical Communications
Artia
Smecky 30
Prague II
Czechoslovakia

Comptes rendus
Gauthier-Villars
55 quai des Grands-Augustins
Paris (VI)
France

D

Doklady Akademii Nauk SSSR
Akademii Nauk SSSR
Moskva, Shubinskii per., 10
(Moscow, U.S.S.R.)

E

Elektricheskie Stantsii
Moskva, Shliuzovaia Nab., D. 10
(Moscow, U.S.S.R.)

Elektrichestvo
Moskva, Glavnyi Pochtamt
Pochtovyi Iashchik no. 648
(Moscow, U.S.S.R.)

Elektro-Post
Elektro-Verlag W. Sachon KG.
Verlagsort (13b)
Mindelheim
Germany

Elektrotechnik und Maschinenbau
Elektrotechnischer Verein Österreichs
Wien I
Eschenbachgasse 9
Austria

Elektrotechnische Zeitschrift
VDE-Verlag G.m.b.H.
Berlin
Wuppertal-Elberfeld
Briller Strasse 99
Germany

Energietechnik
VEB Verlag Technik
Berlin NW 7
Unter den Linden 12
Germany

Erdöl und Kohle
Industrieverlag von Hernhaussen, Kommanditgesellschaft
Hamburg 11
Rödingsmarkt 24
Germany

F

Fette, Seifen, Anstrichmittel
Industrieverlag von Hernhaussen KG
Hamburg 11
Germany

Flamme et Thermique
5, Rue Michel-Ange
Paris (XVI)
France

Fonderie
Editions Techniques des Industries de la Fonderie
12, Ave Raphaël
Paris (XVI)
France

Forschung auf dem Gebiete des Ingenieurwesens
Deutscher Ingenieur-Verlag G.m.b.H.
Düsseldorf
Germany

Frequenz
Fachverlag Schiele & Schön
Berlin SW 29
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SUBJECT INDEX

Since the annotations in this book are grouped into broad classes on the basis of process or property, the major emphasis in the index has been placed on materials, products and applications. Entries under the names of processes and properties usually refer only to general treatments of the subject. Wherever possible, items have been indexed under the name of the material or the type of material (metals, alloys, and metal forms) or product. For example, material on the rolling of aluminum appears as a subhead under the main entry "Aluminum alloys," and not under the main entry "Rolling." Similarly, material on the welding of steel plates in shipbuilding appears under the main entry "Ships" rather than under the main entries "Welding" or "Steel plates." In general, subject entries conform to the usage in the "ASM-SLA Metallurgical Literature Classification," published by the American Society for Metals, 1950.

Alloy systems in which one member is predominant are indexed under that member only. Where two or more members share predominance, entries have been made under each member.

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